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THE BRICKBVILDER

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THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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THE BOSTON SUBWAY; A LOST OPPORTUNITY.

IT is the present expectation that the Boston Subway will be completed and in actual use early this fall, possibly by the first of September. About a third of it has been in operation now for nearly a year, and the public has had a pretty good opportunity to judge of its value. We believe that we are right in saying that the general consensus of opinion is that as an engineering structure it is well planned, well built, and that on the whole it fulfils all the practical requirements had in view at the time of its inception. The surface tracks which it was intended to supplant have not yet been removed, but the traffic on the streets above has been made very much more free, and there has been an almost entire absence of blockades in the subway itself. As a means of inter-communication between different portions of the city it is undoubtedly a success.

The subway has been built under the direction of a commission which was appointed by the Governor. This commission, as originally constituted, included three lawyers, one professor of engineering, and one gentleman who could, perhaps, be most fairly classed as a capitalist. The changes which have occurred in the commission have not altered the proportion of lawyers, nor have any other professions been represented. At no time has there been upon the board, either as member or adviser, an architect or any one with the slightest claim to trained artistic ability. It would be hard to select a commission composed of men more thoroughly matter of fact and business-like in every attribute. They have done their work admirably from a mechanical standpoint. They have drawn around them the very best of engineering advice, there has not been a suggestion of anything but the most strict, business-like proceeding from first to last, and as far as the commission has gone it is certainly deserving of the most hearty thanks for the manner in which it has conducted the work. If the subway were nothing but a big sewer, or a system of underground conduits to carry water, we should say that nothing more could have been hoped for or desired. Unfortunately it is a work of public utility which is constantly before the eyes of thousands of citizens, and it is a matter of the deepest regret that the commission, after having shown such unusual executive ability, and after having solved so satisfactorily the practical considerations, should have seen fit to so utterly ignore every consideration of art or beauty below ground. The interior of the subway is about as enlivening and cheerful as a second century catacomb. There is not one single redeeming feature about it in an esthetic sense, and it is the strongest sort of epitome of the unfortunate way in which the artistic element is so totally disregarded in our public work.

The average Philistine of the type which is represented by our able subway commission seems to be imbued with the feeling that art is a condition which can be tolerated, and within certain limitations grudgingly admired, provided it does not entail any expense; that the moment the artistic element begins to count as a factor in the cost it must be sternly suppressed. We, as a nation, are gradually developing into an appreciation of the educational value of good looks. We are not there yet, by any means, and the prospect is sometimes dreary, but we are not quite so badly off in this respect as we were two generations ago, and there are fortunately a few leading spirits who appreciate that a public work is not put up simply as a money-saving machine, that works of public utility may rightfully take to themselves a certain element of artistic appearance, and that the expenditure of a small added percentage in money is well repaid by the constant enjoyment which it can afford. We appreciate this sentiment in our public parks. Boston is spending millions of money every year to provide and maintain a park system which shall be not merely healthful, not merely afford good air to the poor, but shall be positively and appreciably beautiful and artistic. No one questions the wisdom of this expenditure, no one would have it restricted, and every one enjoys the results. In exactly the same manner the Boston Subway should have been treated as an opportunity to not only accommodate the people in a thoroughly business-like manner, but also to accommodate them in surroundings which would at least not be distressingly ugly.

Specific comparisons may be dangerous, but we cannot forbear referring our readers to the issue of this journal under date of December, 1893, wherein was shown a possible arrangement for the subway which would have permitted of a very considerable display of taste, good proportions, and pleasing colors, without involving a decided additional cost. If any one doubts the possibility of the successful treatment of such a problem as the subway presents he has only to recall such a building as the so-called Mosque at Cordova, a structure the style of which could have been reproduced in our subway stations with extremely effective results and in a manner which would have been much more permanent than the ghastly painted white columns and girders and the absolutely uninteresting lines of the existing structures. We will venture to say that any one of fifteen or twenty architects throughout this country who could have been selected could have made the subway interesting, worth the going to see for itself, and every bit as valuable in a practica

sense without involving an added expenditure of more than ten per cent. We believe, as we have repeatedly stated in these columns, that the only material suitable for constructing a work of this kind is brick in one or another of its forms; that had the ceiling been vaulted throughout in substantial masonry, the construction would have been more permanent and would have allowed a better opportunity for pleasing effects; and even if artistic considerations must perforce give way to engineering judgment, and we are obliged to use the species of steel-skeleton construction which was followed in the subway for the walls, it at least might have been lined throughout with enameled brick, not necessarily a plain white, but in some pleasing colors which would rest the eye and give a little relief to the senses. The commissioners made some very careful investigations as to what material to use for lining these walls. They finally decided on a facing of Keene's cement, which has been put in the finished portion throughout, except at the stations, and when fresh presented a very pleasing appearance; but before the work had been in use a month it began to look disreputable, and is now simply an unsightly, blotchy plaster wall. We were told at the time that the reason for this selection was that to use enameled bricks throughout would involve an added expense of $300,000. This is simply an example of that thrift which is the curse of so many of our public monuments and for which our descendants will not rise up and bless us.

The unthinking passenger who rushes down the subway steps, buys his ticket, and rushes off through the swiftly moving cars, may reason that the tunnel as built is as good as though better looking, that as long as the work is done well and the cars expeditiously despatched, that is all that can be expected; but the man who thinks, the man who knows what might be and has had opportunity to appreciate the influence in the long run, on the passing crowd, of good proportions, agreeable colors, and artistic arrangement, will feel every day he enters the subway, that it is a lost opportunity, that we might have had in this undertaking a piece of engineering work which could have been clothed with architectural beauty and been a pride to the city quite as truly as our parks or gardens. We have to thank the subway commission for their excellent work, their scrupulous business methods, but, unfortunately, we have also to thank them for building an ugly hole in the ground, constructed so well that we can never hope to afford to tear it out and do it as it ought to have been done.

BOOK REVIEW.

THE LAW OF MECHANICS' LIENS UPON REAL ESTATE IN MASSACHUSETTS. By HENRY T. LUMMUS, LL. B., of the Essex Bar. Little, Brown & Co., Boston.

Very few works have been written upon the topic of lien laws, and fewer still have any tangible value to the layman, as it is a subject which in its practical application can most safely be left to one's lawyer. The best that can be hoped from such a volume, in as far as it appeals to a possible party to a suit, is that it shall present a careful classification of decisions and intelligent generalizing of conclusions. In order to be of real value such a work must of necessity be quite local in its nature, as the customs vary greatly in the different States. Mr. Lummus has put into very compact shape the present law of Massachusetts as regards mechanics' liens. The subject matter is presented in a very easily understood form, and is accompanied by a thorough cross index which makes the work unusually valuable. While the best way to avoid liens on a building is to have nothing to do with any but thoroughly responsible contractors, still the most careful architects and owners are occasionally caught unawares, and a study of the 139 pages of this book will go a long ways towards posting one as to individual rights and the way to obtain them.

PERSONAL.

ALBERT KELSEY, former president of the T Square Club, Philadelphia, has just returned from an eighteen months' stay in Paris and the Continental cities of Europe, where he has made an especial study of the "Science of Cities" for the University of Pennsylvania. In this connection Mr. Kelsey expects to deliver a course of lectures on "Focal Points in Foreign Cities," "Urban Circulation, Transportation and Delivery," and "Commercial Architecture."

MR. J. GEORGE MORGAN, architect, Philadelphia, member of the T Square Club, has been appointed second lieutenant in the Volunteer Engineer Corps, U. S. A.

FRANK E. WETHERELL, architect, formerly of Peoria, Ill., has opened an office at Oskaloosa, Iowa. Catalogues desired.

A. B. ROSENTHAL, architect, has removed his office from 620 Milwaukee Avenue to 81 Dearborn Street, Chicago, Suite 341–43.

J. L. O'CONNOR, architect, Openheimer Building, Austin, Texas, will be glad to receive catalogues.

ILLUSTRATED ADVERTISEMENTS.

THE following illustrations appear in our advertising pages: Land, Title, and Trust Company's Building, Philadelphia, Pa., D. H. Burnham & Co., architects; advertisement of Conkling, Armstrong Terra-Cotta Company, page v; mantel in hall of Miss

HERALDIC PANEL FROM THE HOTEL RALEIGH, WASHINGTON, D. C.
Executed by the New York Architectural Terra-Cotta Company.
H. J. Hardenbergh, Architect.

Fitzgerald's house, Roxbury, Mass., William G. Preston, architect; advertisement of Fiske, Homes & Co., page vii; residence of Louis Schoellkopf, Esq., Buffalo, N. Y., C. D. Swan, architect; advertisement of The Harbison & Walker Company, page xv; Manhattan Hotel, New York City, H. J. Hardenbergh, architect; advertisement of Henry Maurer & Son, page xxiii; shapes of roofing tile made by the Celadon Terra-Cotta Company, Limited, in their advertisement, page xxvii; illustration showing ten positions in which the Bolles Revolving Sash may be placed, page xxxvi.

The American Schoolhouse. IX.

BY EDMUND M. WHEELWRIGHT.

THE schools in which courses in mechanical training are given in conjunction with the principal courses of high schools are known either as "Manual Training" or "Mechanic Arts High" schools.

In these schools manual skill is not taught for its own sake. By the course of instruction offered, intellectual activity is encouraged through knowledge of tools, materials, and forces, as well as through books. Manual training is but one, and in many cases the smaller, part of the instruction given; such training is used as a means to an end and not as an end in itself. "Mechanic Arts High," although a clumsy word, more closely designates the purposes of such schools, while the name of "Manual Training" confuses the purpose with that of the technical trade schools, whose object is purely utilitarian. If the mechanic arts high schools have a future success commensurate with that of the past it is not improbable that a better designation need not be sought, and the need will not exist to use any other name than that of high school.

Schools of this type, the most distinctly American development of schoolhouse architecture, are provided with the class rooms, recitation rooms, and laboratories, and drawing rooms of the high schools, and in addition have rooms equipped with machinery for wood and metal working, with carpenters' benches, forge shops, and in some cases molding and modeling rooms.

These schoolhouses are the most complex and latest development of the high school in this country, and as such necessarily have not yet been perfected in all their features. But few schools of the type completely designed for this purpose have as yet been built and there are no foreign models to help us except in regard to minor details. The development of the plan of the mechanic arts high school offers still an important field for the joint labors of our educators and architects.

In many cases, to meet the needs of such instruction, existing buildings have been adapted for shops. At St. Louis, Chicago, Cambridge, and Boston, especially designed high schools of this type have been built. At Toledo, an addition for work shops, etc., has been added to a high school building.

The St. Louis Manual Training School was built partly in 1879 and partly in 1882, at a time when there was little precedent to guide its projectors. On the third floor of this building is the first-year schoolroom fitted with ninety-six desks for first-year pupils, two recitation rooms, each fitted with twenty-four shelf chairs, a drawing room, physical laboratory, one wood-working room with benches for twenty pupils.

On the second floor is the second-year schoolroom with eighty-eight desks, this class being composed of four divisions of twenty-two each. Here, also, is a wood-working room with twenty-four benches and twenty-four turning lathes, a molding and soldering room with twenty-four benches, and a drawing room.

In the first story is the office of the principal, the third-year schoolroom with sixty-three desks, the forging shop with twenty-two forges and anvils, of which but twenty are shown on the plan here given. There is no basement under the forge shop. The machine shop is also on this floor. This room is equipped with lathes, drills, and other machine tools and has fourteen benches, marked B on the plan, and dressing lockers (marked C). A small chemical laboratory adjoins the first-year schoolroom.

The second and third floors are provided with the requisite wash rooms; hose for the first-floor shops are placed in the basement. Here, also, are dressing rooms and toilet rooms, the engine room, the repair shop, a lunch room and a warm-air chamber, the boiler being in a separate building. Under the steps is the fireproof oil room.

Dr. C. M. Woodward, the director of this school and author of a treatise on "The Manual Training School," says, in criticism of the plan of the Toledo school: —

"1. The forging shop, which is the noisiest shop in all, is rather too near the schoolrooms. In warm weather, when the windows are open, the noise is somewhat troublesome. I should prefer a plan which turned the shop wing ninety degrees to the left, so as to place the forging shop directly beyond the machine shop. In other words, I would put the school and drawing rooms at the head of a T, and the shops in the long central part, with the forging shops at the extreme end.

"2. There is no well or shaft for the transmission of power to the several floors from the basement. The transmission should be from floor to floor by belts with suitable tighteners. Each shop should be furnished with a clutch, by means of which the teacher in charge may turn on his shop or turn it off at pleasure, without interfering with the other shops. At times the teacher needs a quiet room where his voice may be easily heard as he gives the theory of a machine, explains the details of a process, or criticizes work before a class. In the transfer of power, gearing is too noisy for a school. The main shafting and pulleys of the machine shop of the St. Louis school cannot be stopped without stopping the engine. While this defect is hard to remedy, it may easily be avoided in a new plan.

"3. On the third floor I would interchange the wood-working shop with the drawing and physics rooms. This would accomplish two things; first, it would place the drawing room and physical laboratory over a comparatively quiet room, as there is no noise in the molding

FIRST FLOOR. SECOND FLOOR. THIRD FLOOR.

ST. LOUIS MANUAL TRAINING SCHOOL, ST. LOUIS, MO.

room; and, secondly, no divisions would pass through a shop where the boys are at work."

Dr. Woodward further suggests that, "As a rule, the study and recitation rooms should be separated from the shops by two walls enclosing halls, stairways, or yard; at the same time I should prefer to have all the rooms for a class on the same floor, or as nearly so as possible, and but a few steps away. It may not work badly to have a division cross the yard, but I advise strongly against sending a division out of the yard, or across the street. I do not favor the transfer of a division of students from one principal to another and back again. No principal would like that arrangement in the case of such a study as arithmetic or spelling, and shop work and drawing should be treated with precisely the same consideration. The same precautions should in all cases be taken to prevent irregularities and loss of time. In short, manual work should be treated as school work, and watched and guarded and sustained as such."

The High and Manual Training School of Toledo, Ohio, is an addition made in 1885 to a large high school. It has three stories and a high basement, in which is placed the forge room or blacksmith shop, the molding room, lumber room, and engine room. The large shops are 40 by 55 ft. The machine shop is on the first floor. Here, also, is the wood-working room, which is fitted with lathes and twenty-four benches. The wood-working room on the second floor is fitted with benches only.

In the Toledo school provision is made for manual training for girls. The girls are taught in divisions by themselves drawing, light woodwork and carving, cooking as a branch of applied chemistry, needlework, cutting, and fitting. One of the large rooms of the second story, and in the third story the corresponding space, is divided into two rooms, one of which is the cooking room, which is thus described in the catalogue of the school:—

"This is 40 by 27 ft., with one large Garland range, two gas cooking stoves, and five double tables 5 ft. long by 5 ft. wide, each table accommodating four pupils. Each girl has her own table space for work, and there is a small gas stove for every two pupils. Each table space has a drawer and cupboard below it for all essential utensils, and each pupil must personally go through every process taught. At the other end of the room are pantry closets for the teacher's use, and a commodious wash room, with all conveniences for girls, including individual closets for the keeping of aprons, clothes, etc."

In the Toledo school each work room is provided with ample wash rooms, which are very important adjuncts of schools of this type.

The Cambridge Manual Training School for boys was founded by Mr. Frederick H. Rindge. The shops and drawing rooms are in a building by themselves, connected by a covered way with the building assigned to the academic course.

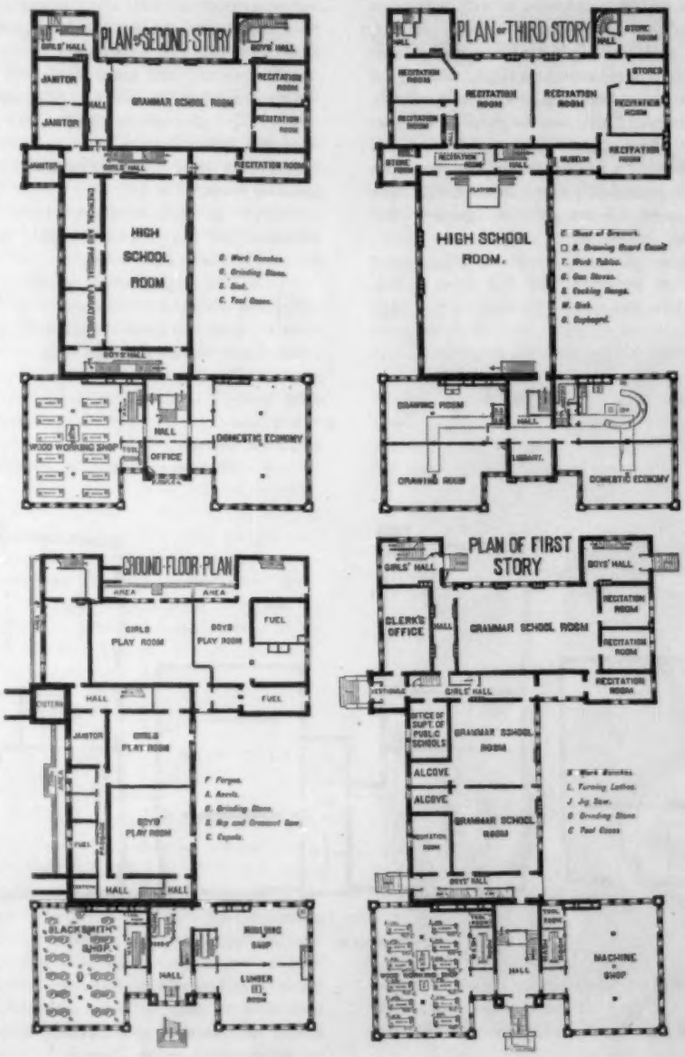
In this latter building are the schoolrooms, physical laboratory, assembly hall, fire drill hall, and gymnasium.

The following description of the building for manual training is quoted from the report of the Cambridge High for 1892, written by Dr. Parmenter, now master of the Boston Mechanic Arts High School.

THE WOOD-WORKING ROOM.

In this room there are two departments, one being for general carpentry, and one for turning and pattern-making. On the east side are eight wood-worker's benches, 34 ins. high, with a top 66 by 43 ins. A vertical board, 5 ins. high, divides the top of each bench into two equal parts, thus making it possible for two pupils to work at the same bench, one on each side, without danger of interference. Below the top of the table, at the right of the worker, are three drawers, 23 by 5½ ins., with a depth of 26 ins., each fitted with a lock. Each pupil has one of these drawers in which to keep the individual tools supplied to him, and his unfinished work. The remaining space below the top of the table is converted into a closet designed to hold most of the implements used in common by the members of different divisions.

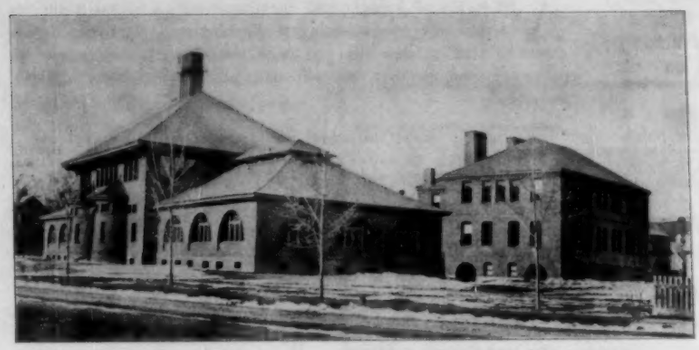
The saws are kept in a special case provided for them in the front end of the room. They are numbered to correspond with the benches, and each pupil is charged with those which he receives and is held responsible for their return, in good condition, to their proper place, at the end of each working period. Between two of the windows is a case for storing the "blue prints" from which the pupils work. This case is 4 ft. 6 ins. high, 2 ft. wide, and 12 ins. deep, and is conveniently divided into pigeon holes for fifteen sets of "blue prints." Near the benches are several stationary glue-pots heated by steam and always ready for use. Conveniently located for preparing materials for the work of pupils is a double arbor bench saw, capable



TOLEDO HIGH AND MANUAL TRAINING SCHOOL, TOLEDO, OHIO.

of being quickly adjusted for either cross-cutting or splitting, and furnished with the most approved devices for facilitating work.

Running the entire length of the west side of the room, in front of the windows, is a bench supplied with pattern-maker's tools, and adapted to be used by divisions of twelve pupils. Attached to this bench, separated by convenient distances, are twelve Fitchburg quick-action vises, with 9 in. jaws, and near each vise is a set of three drawers, one of which is assigned to each pupil for his individual tools and unfinished work. By the side of the drawers, in each section, is a locker designed to contain the tools which are used in common by members of different divisions.



CAMBRIDGE MANUAL TRAINING SCHOOL, CAMBRIDGE, MASS.

In front of this bench, at a convenient distance from it, is a row of twelve pattern-maker's lathes, each having a 6 ft. bed, and capable of doing work 12 ins. in diameter. Two lathes are placed side by side, 2 ft. apart, their bed pieces being connected by a case carrying two drawers, each fitted with a lock, and designed to hold the tools used in wood turning.

At one end of this row of lathes is a large pattern-maker's lathe, having an 8 ft. bed and being capable of doing work 20 ins. in diameter. This lathe is fitted with the most approved devices for doing all kinds of work, and is designed to be used only by the instructor and by pupils who develop special skill and demonstrate their ability to do a high order of work. By its side are two iron speed lathes, 9 in. swing, 42 in. bed, constructed in the machine shop by the members of the class of '91. Near at hand are a band saw, 26 in. wheel, fitted with an adjustable iron table and a scroll saw, both of the most approved pattern. A tool closet, located in the center of this room, is supplied with a great variety of tools adapted to every possible need of a wood-working establishment. The lumber loft is easily reached by a flight of stairs leading to the top of this closet.

THE IRON-WORKING ROOM.

This room, like the wood-working room, is fitted for two distinct kinds of work. The appliances upon the west side are adapted to general iron fitting,—chipping, filing, drilling, scraping, etc.; while those on the east side are for use in machine-shop work. Upon the west side are located four benches 3 ft. high, and having a top 9 ft. by 3 ft. 8 ins. A vertical wire screen, 24 ins. high, divides the top of each table in the center and serves to protect pupils on opposite sides from the chips which fly from each other's work. Each side of these benches is furnished with two vises and two sets of four drawers, the upper drawer of each set being used in common by the pupils of different divisions. One of the three other drawers is assigned to each pupil for his individual tools and work. At the beginning of a lesson each pupil obtains from the tool room a tray which fits the upper drawer of each set, and which contains all the tools used by the pupil except the hammer.

In addition to the benches described above, there is a side bench furnished with a large number of tools needed for special work. Four small speed lathes are also used in this department for drilling, hand-turning, and polishing.

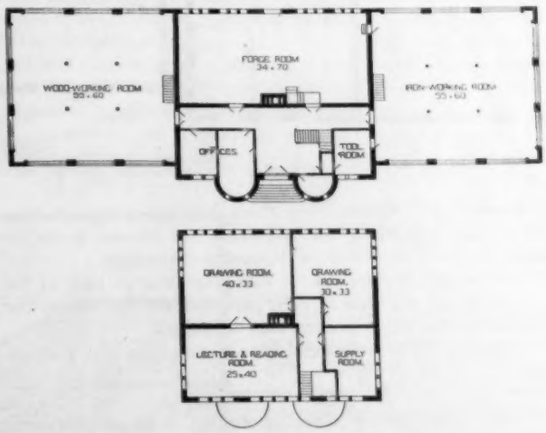
On the opposite side of the room are the equipments of the machine-shop department, consisting of engine lathes, four 16 in., one 15 in., seven 14 in., and one 11 in.; one Brainard, No. 3, milling machine, with attachments; one cutter-grinder; a 24 in. planer; a 15 in. shaper; a 24 in. upright drill; a sensitive drill; a 36 in. grindstone, and an emery grinder. The entire side of the room is occupied by a long bench like that found in the pattern-making department, fitted with twelve machinist's vises and as many sets of drawers in which are kept the tools.

The tool room is furnished with drills, reamers, arbors, taps, lathe dogs, and tools of every variety in sufficient number to supply each boy with whatever he needs to complete a given job. The common cutting tools used by each pupil are those which he forged the year before. Each boy is given ten checks, bearing his school number, which may be exchanged at the tool room for the articles needed; the check takes the place of the tool loaned until it is returned in good condition. A small cupboard, attached under each lathe, contains wrenches, change-gears, and other lathe accessories. Similar arrangements are made for the accessories of other machines

The engine which drives all of the machinery is situated in the iron-working room, and is under the charge of a competent engineer, who gives a course of instruction concerning the construction and care of engines and boilers.

THE FORGE ROOM.

The room is furnished with fifteen Sturtevant portable forges, each connected by proper pipes with a blower, and with an exhaust fan which prevents the poisoning of the air by coal gas, and secures perfect ventilation. Near each forge is an anvil weighing 125 lbs.;



FLOOR PLANS, CAMBRIDGE MANUAL TRAINING SCHOOL.

and a tool bench, 25 ins. high, with a top 21 by 16 ins., surrounded by a rim 2 ins. high, to prevent tools from slipping off. Each bench is furnished with three drawers, which occupy the entire space below the top. A standard 3 ft. high, attached to the back of the bench, supports the "blue prints" from which the pupils work.

Six wooden pillars are fastened securely into the masonry of the floor, in convenient locations, to each of which is attached a wrought-iron blacksmith's vise having 4½ in. jaws. Numerous other tools, needed for special kinds of work, are to be found in different parts of the room. Nothing is wanting which is likely to be needed by a blacksmith. The boilers which generate steam for

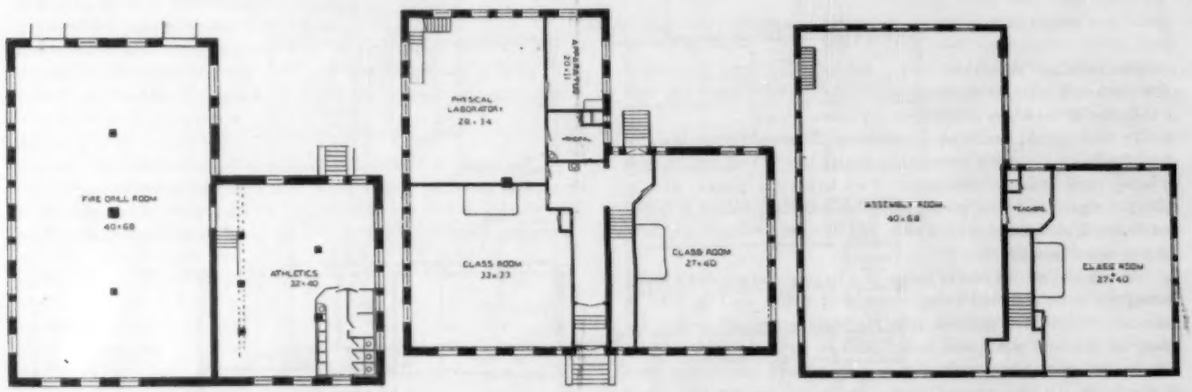
the engine and for heating the building are located in this room. These boilers also furnish steam for heating the new building for the academic department, and for driving the ventilating fan which supplies its rooms with fresh air. They are supplied with a feed-water heater, feed pump, injector, damper regulator, and all accessories of practical utility.

THE DRAWING ROOMS.

These large, well-lighted rooms, situated upon the second floor, contain thirty double tables, 36 ins. high, with a top 24 by 76 ins. Each table has two large drawers, designed to hold the drawing materials which are used in common by the pupils of different divisions.

The teacher's platform, measuring 6 by 10 ft., is elevated 3 ft. above the floor, thus making it possible for the most distant pupils to obtain an unobstructed view of the objects placed upon the teacher's table, and of the illustrations upon the blackboards, the lower edges of which are 3 ft. above the platform. These blackboards, three in number, are placed one directly in front of another, each being counterbalanced by weights, like an ordinary window sash, so that it can be dropped down out of sight.

In the rear of the room are cases of small drawers, one of which is assigned to each pupil for his drawings and individual



BASEMENT. FIRST FLOOR. SECOND FLOOR.

FLOOR PLANS OF BUILDING FOR ACADEMIC DEPARTMENT, ERECTED IN 1893, CAMBRIDGE MANUAL TRAINING SCHOOL.

drawing material. Near at hand is the apparatus used in making "blue prints," including a most convenient and efficient device for holding the prints while they are exposed to the sunlight.

All the appointments of this room, like those of each of the other rooms, are first class in every particular, and the work of the pupils shows that they appreciate their advantages.

Adjoining the drawing rooms are a reading room and a supply room.

THE BASEMENT.

With the exception of the space required for the janitor's room, the central portion of the basement and the entire southern wing are devoted to toilet rooms, wash rooms, and two hundred and seventy-five large lockers for the accommodation of the pupils' clothing. These lockers are grouped about large sinks supplied with hot and cold water. Leading from one of the wash rooms is a well-appointed shower bath. These rooms are kept in perfect order, and are under the constant supervision of an efficient janitor. Every needed convenience has been provided, and no pupil is permitted to form slovenly personal habits. Each pupil must provide himself with a hair brush, comb, shoe brush, whisk broom, two towels, wash basin, and soap dish.

In the northern wing is a large kitchen, furnished with a hotel range and the best modern appliances. Adjoining the kitchen is a small dining room in which dinners are served, at cost, to the instructors and such pupils as desire them. The remaining space in this wing is devoted to a supply room, and to a large dining room in which pupils eat the lunches which they bring to school.

RULINGS ON QUESTIONS CONCERNING REAL ESTATE UNDER THE WAR REVENUE LAW.

A SERIES of hypothetical questions were submitted to the internal revenue officials at Washington yesterday by the *Herald's* staff in that city, and, with the answers, are reproduced below, in the hope that they will make plain some matters hitherto undecided: —

Question: Must the actual consideration be stated in a deed, or will it suffice to say "$1.00" and stamp to cover the actual consideration? *Answer:* The actual value need not be stated, but stamps must be affixed for the full value.

Question: If a piece of real estate, worth $10,000 and sold on that basis, is sold for $5,000 cash and a mortgage of $5,000, must the deed be stamped to cover the $10,000 or the equity, $5,000? *Answer:* Stamp must be for the entire value.

Question: If there is already a mortgage of $5,000 on a parcel worth $10,000, must the deed be stamped to cover $10,000 or the price paid in cash? *Answer:* Stamps must be affixed for $10,000.

Question: Under the law, both promissory notes and mortgages must be stamped. Must the note accompanying a mortgage be stamped as well as the mortgage? *Answer:* Both must be stamped.

Question: It is customary to allow mortgage notes to run after they are due without renewal. Would such a note, properly stamped when issued, be good beyond the original time if not restamped? *Answer:* Where there is no renewal the original stamp is sufficient.

Question: Mortgage brokers are held to be subject to the $50 broker's tax. If a broker (real estate) sells a piece of real estate for $10,000, of which $5,000 is cash and $5,000 on a mortgage given by the purchaser to the vendor, does he become a "mortgage broker"? *Answer:* No.

Question: If a broker sells a parcel of realty on which there is already a mortgage, which the buyer assumes, does he, by such business, become a "mortgage broker"? *Answer:* No; if he confines himself to purely real-estate transactions.

Question: Can a man, not a broker by trade, receive any part of a commission for a transaction in which a mortgage figures without becoming a "mortgage broker"? *Answer:* No; not in a single instance. —*Boston Herald.*

Architecture of Apartment Buildings.

II.

BY IRVING K. POND.

BEFORE going too deeply into the arrangement and disposal of the single rooms of an individual apartment, the architect should give great consideration to the problem of the public halls and corridors. The man who is ordained by fate, beneficent or otherwise, to dwell in an apartment must be made to feel, and in the true sense, that his apartment is his castle, just as the householder is made to feel that his house is his safe retreat. It is the rule of the best designers of houses in blocks never to place in close proximity the main entrance doors of two adjacent houses, but to make each main entrance a separate and distinct feature. This rule exists in response to a very natural and proper demand on the part of refined and sensitive householders to have their homes in outward expression, as in absolute fact, places of refuge and retirement. The dweller in an apartment has the same rights as has the householder, and it is the duty of the architect to respect these rights; to go further, even, and inspire this feeling for privacy, and foster into an abundant growth what might not flourish otherwise. It is the rule of the best designers to allow, where possible, but one, and never more than two apartments to open from the public hall in any one story. And rather should a designer work to apply this rule simply than by misplaced ingenuity seek to corral a number of families on one stage, and herd them about one stairway or elevator well. There is a loss of self-respect to all concerned when this rule is not applied, and most especially so when the freight elevator is allowed to open off this same public hall; for then the public hall to which only the members of families and their friends, and these in street dress at least, should be permitted, becomes the runway of the butcher, the baker, the grocer, and the servants in the garments of the kitchen and the scullery, and where is self respect! The suggestion of privacy and isolation should begin at the street door, and still be in evidence at the thither wall of the rear chamber. Trial upon trial has been made by designers of recognized ingenuity to get the service across public corridors without bringing it into sight, but never has the success been startling. One expedient was to cross the public corridor in a sort of mezzanine story, but this required rather more of a height to the stories than is desirable in any but the most sumptuous apartment buildings, and there the question never should arise. This point cannot be too strongly insisted upon, that all service connected with individual apartments should be religiously excluded from the public corridors.

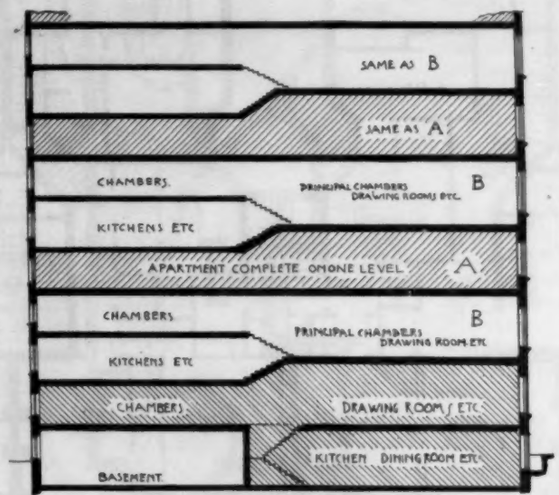


FIGURE 13

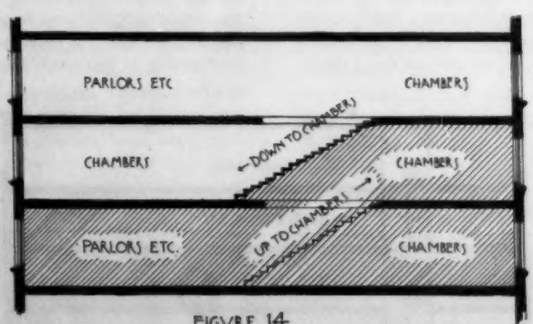


FIGURE 14

The position of living room, dining-room, kitchen, and chambers in relation to each other, and to give the best effect of homelikeness, desired privacy, and the highest economy of service, has been discussed, but something should be added as to the special position or situation of each of these, and of other rooms necessary to a complete apartment.

The living room and library should, of course, be given the sunniest and most pleasing prospect compatible with the location of the building.

As to the dining-room, while it is desirable in common with all rooms that direct sunlight should penetrate it at least during some period of the day, it is not necessary that this room should be as sunny, even, as the chambers. The most pleasant and homelike of the many repasts are those partaken of under the soft glow of the lamps, and social gatherings at the board, almost without exception, are under artificial light, when the sparkle of the eyes, the soft tints of the complexions, the bright colors of the garments, and the deep shadows against which all is set, add charm to the picture and zest to the appetite and to the conversation. The dining-room may give upon a court, but if so the windows must be so arranged as to exclude unpleasant sights and noises; but it seems unnecessary to give to the dining-room a position of prominence equal to that of the parlor or living room, as is generally the case in the French apartment.

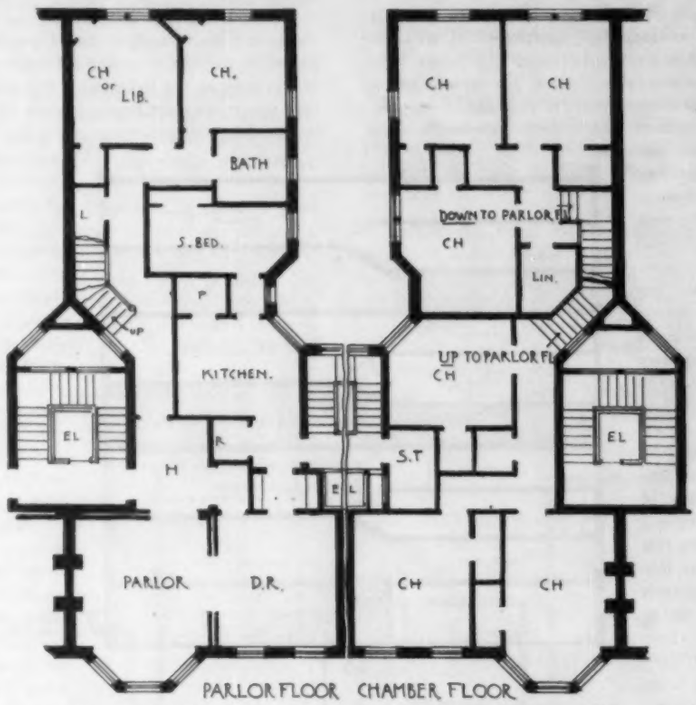
The kitchen should have a sunny aspect, and should be on the open air or on a well-ventilated court; and in either case the windows should be arranged so that the work going on within shall not be in evidence from chambers or other principal rooms on the same court. All well-planned apartments will have the ice chest in close proximity to the kitchen, but not so near as to get the kitchen heat. These refrigerators are attached to the building, and in many instances the chill is supplied from the ice machines in the basement, as the hot water is supplied to kitchen and toilet rooms and to plumbing fixtures in other rooms from the general hot water plant. To-day no tenant would consider the kitchen complete without its gas or electric range, while for many years now, especially in medium-sized apartments, a laundry tub has been placed under the drip board of the sink making possible the laundrying of light articles at any desired time and without recourse to the main laundry.

That the chambers should be as sunny as is possible to plan for goes without saying, for no room can be considered perfectly wholesome and desirable as a sleeping apartment into which the sun does not at some time during the day freely penetrate. A general laundry with three tubs and a dryer should be provided for each three apartments at most, thus giving to each apartment the use of the laundry two days in each week.

The fuel gas for the laundry stoves and dryers goes through individual meters, each controlled from the kitchen of its respective apartment, so that the careful mistress of the apartment may see, by going to the kitchen, that the gas for which she is accountable is shut off when the laundry is not in use or when it is in use by other parties. This arrangement saves continual trips to the basement or the attic, in one of which localities the laundry is placed, when it is

not an individual establishment connected directly with the working portions of the apartment.

This last arrangement of course exists only in the most expensive and elaborately planned apartments. As to whether the laundries should be in basement or attic depends somewhat on other details of the plan. If air in free circulation abounds about a well-ventilated basement the laundries may well be placed there. If, however, the laundries open for ventilation on a narrow, deep court, on which chambers and principal rooms depend, then odors must come in course of time to be not a trifle obnoxious, and the laundries themselves become unwholesome. If the roof of the building is made a place of resort in hot weather as is attempted now, more or less frequently, then the attic is no place for laundries or odor-breeding compartments.

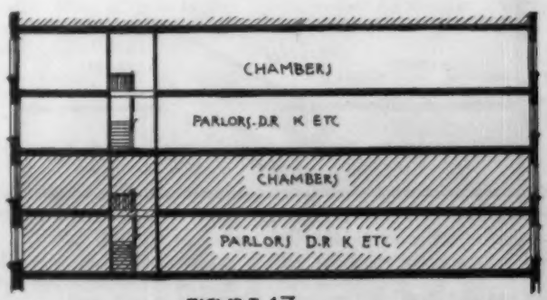


FIGVRE 15 FIGVRE 16

A servants' toilet room containing bath-tub, basin, and closet is the necessary adjunct of every well-planned apartment of more than medium cost. In the more moderate buildings these toilet rooms may be placed in the basement, or, better, off the stair landings of the servants' stairs and should be under the daily inspection of the janitor. From four apartments at most in which a single servant is employed, or from two apartments in which there are two servants, should one of these toilet rooms be accessible. Each and every apartment should have a good-sized storage room in the dry basement, and the walls of these rooms should be of tile or of solid plaster to prevent the spread of fire or vermin. Other and sufficient storage space should be provided in the apartment in the form of closets, cupboards, pantries, etc. The criticism never has been brought against an apartment that closets were too great in number or too ample in amount of storage space provided.

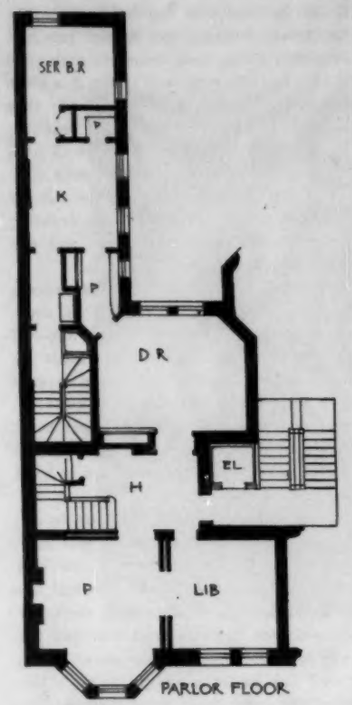
Probably the stable room which was wont to exist at the rear of the court of every French apartment building is transformed nowadays into a bicycle storage room. Sure it is that no apartment building in this country is complete without a conveniently located, easily accessible, and well-equipped room for the bicycles, which are as crying a need in the modern household as were babies in the olden.

The servant's bedroom has always been a matter for serious consideration. The most convenient place in most cases is near the kitchen, and in most plans opens directly into that room. It is better that an air lock should intervene, for kitchen odors, etc., are no more acceptable in a servant's bedroom than in a front chamber. At any rate, the servant's bedroom should be ample and so situated as to be easily and readily ventilated. The advisability of placing the servants from all the apartments in a building in a group by themselves is not yet determined. In France the *concierge* and his generally not numerous family occupy a small apartment at the street level, beside the carriage entrance to the court or near the main entrance door. The servants in many instances are quartered in the *entre sol*, a low story over the shops, which may occur along the street front, or over the stables which generally occupy the lower story at the rear of the court, or they are assigned to rooms in the attic story. As yet this method has not met high favor in this country, but it may have to be adopted as apartments become more luxurious and proportionately greater and higher class service is demanded. Undoubtedly, the necessity for more space than could be gained advantageously on one floor is responsible for the grouping of servants' quarters in a portion of the building remote from the apartments, as it is responsible for the grouping of laundries and storerooms in the basements or in the attics of our American apartment buildings. This same necessity gives rise to a scheme which has been put into practise, not altogether unsuccessfully in some instances, of giving considerably reduced height to the story in the portions containing the unimportant chambers and the kitchen arrangement, and thus getting an increased number of stories in that portion of the building as is indicated in section in Fig. 13. The difficulty with this scheme in general is that it requires a wasteful height of story in the main portion to get a respectable story or mezzanine in the rear, or it is apt to lead to an undesirable complication in plan and an awkward change of levels in corridors through which there is much service. A scheme which possibly is an improvement on this last, and which is especially adaptable to high buildings on shallow lots, is that of using a story and a half to each apartment, as is indicated in section in Fig. 14, and in plan in Figs. 15 and 16. The general advantage and the simplicity of the scheme are apparent with a little study of these figures. The chambers are entirely isolated, and all the rear chambers are quiet, being in a "stack" of chambers. The front chambers, to which one descends from the

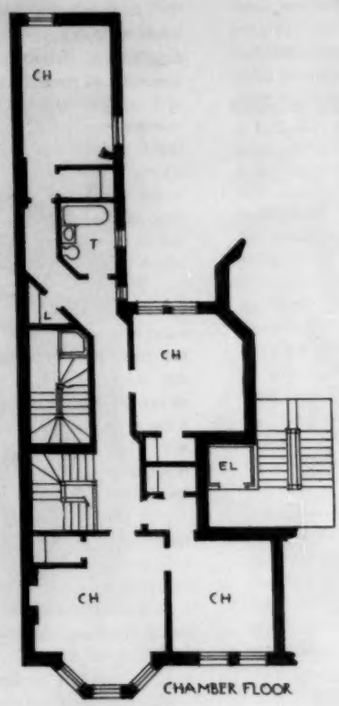


FIGVRE 17

main floor of the apartment to which they belong, are under the living rooms with which they communicate, and hence may be kept quiet, as the noises which disturb in an apartment building are those which emanate from the story above.



FIGVRE 18



FIGVRE 19

The final and full development of the idea of using more than one floor for the accommodation of the rooms of one apartment is seen in section in Fig. 17, and in plan in Figs. 18 and 19, which show the living and chamber floors, respectively. The idea consists in using two entire floors for the same apartment, gaining all the advantages of the two-storied single house, and combining them with the general economy of service and the freedom from responsibility which are the main points afforded by an apartment.

It would seem that arguments in favor of the two-story scheme for apartments should be unnecessary where it can be applied economically to a particular location; but arguments have been made at times and have failed to convince. However, certain owners have recognized the advantages, and the general scheme has been employed. The especial plan presented in Figs. 18 and 19 has been used greatly to the advantage of itself and its neighbor in a scheme on a double narrow lot, as is indicated in Fig. 20. Here every important room in the building, including the janitor's quarters in the basement, gets sunlight, and all rooms, bathroom included, are on the free air of the street or of an ample open court. The combination of types gives prospective tenants a choice, and so gives added value to the property.

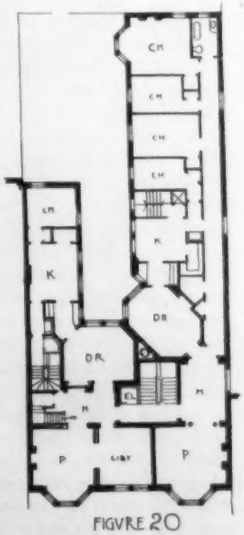
One structural matter now comes to the fore. It is an important matter which has not been overlooked, but which has been removed from its natural context so as the more to bring it in evidence, and it concerns the stairs and elevators. The stair shafts and the elevator wells of any apartment building, of no matter how few stories in height, should be of absolutely incombustible material; this applies to the servants' stairs as well as to the main stairway. This much may be realized in otherwise combustible buildings with little added expense, and the architect should insist on at least this much. But, better yet, each and every municipality should take the matter in hand and insist that every apartment building of over two stories in height erected within its borders should be of fire-proof — not merely "fire-proofed" — construction. The cost should not stand in the way; for even in this day of cheap wooden posts and studs the fire-proof apartment building will not cost more than from 10 to 15 per cent. in excess of the cost of the tinder-box construction. This should not be allowed to weigh against the value of life and neighboring property.

A matter of convenience which should be taken well into account is that of bells and calls from the living rooms and the chamber quarter to the kitchen or servants' quarter, wherever they may be placed, and from some readily accessible point in each apartment to the janitor's quarters. The development of the apartment beyond the bounds of the tenement or the mere "flat" renders necessary all the refinements of convenience which are to be found in every well-appointed house.

So far in this review of the development of the apartment building only more modest types have been presented, and of these only sufficient to illustrate the principles which underlie the planning of apartments generally. Nor does it seem necessary to present more elaborate examples, for the principles are the same, and once understood can be applied to any scheme, however modest or however elaborate. The difference is in degree and not in kind.

The apartment house problem is worthy of the mettle of the most talented architect, on the side both of reasonable and æsthetic planning, and of artistic handling of interiors and exteriors. The problem is more complicated than that presented in the design either of an office building or of a mansion, and comprehends the structural and economic questions involved in the one and the æsthetic possibilities inherent in the other.

The designer of the apartment building holds it in his power to make multitudes see the beauty of simple direct solutions of economic problems of every-day living, based on a sympathetic comprehension of what a refined home life may be, and also he holds the power to bring home to a great number of people by forcing a direct contact, an appreciation of the value of æsthetic surroundings in helping them to realize the ideal of living. This can be done, if by an architect, only by one who has added a mastery of the principles of planning and design to a deep appreciation of what is the real essence of a refined, contained, and sincere home life.



FIGVRE 20

THE Illinois Board of Examiners of Architects, after an examination, at the University of Illinois, at Urbana, have issued certificates to the following competitors, out of a class of eleven: William C. Swern, Chicago; Walter F. Shattuck, Chicago; Bernhard L. Hulsebus, Peoria; Albert C. Phelps, Joliet; Theodore W. Pietsch, Chicago; and William H. Schroeder, Chicago. This list is given in the order of merit marks.

COOPERATION BETWEEN ARCHITECT, ENGINEER, AND TERRA-COTTA MAKER.

BY THOMAS CUSACK.

THE CONSTRUCTION OF BALCONIES.

THE fundamental principles of composite construction as applied to balconies and other projecting members were reviewed at some length in connection with Figs. 52 to 56. Further examples are now given, in one of which (Fig. 57) a balcony of the conventional type is carried on its own brackets, supplemented by a very small amount of iron (or steel), and it of the simplest kind. The 4 by 4 in. cantilevers, for which provision is made in the joints, connect with a 5 in. I beam built into wall longitudinally. From this they have a purchase equal to the thickness of the wall, which, in the present instance, is 2 ft., the blocks themselves acting in conjunction with the wall as a fulcrum. These blocks, as in those of Fig. 55, are molded open on the top bed, and when adjusted to line on a temporary staging the chambers are filled with concrete. The whole platform is then floated off to required grade with about 1½ ins. of granolithic troweled to a smooth surface.

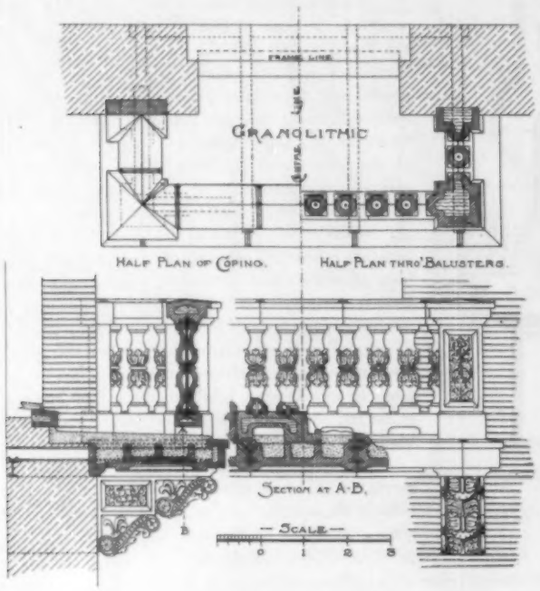


FIG. 57.

A platform constructed on these lines would be self-supporting under any weight likely to be placed upon it; even though the two brackets were taken away altogether it would stand in the case of a wall of that thickness. With them, however, 12,000 lbs. equally distributed would be considered a safe load for a balcony of the same general dimensions. The introduction of a steel triangle, such as is shown in Fig. 53, would be not merely superfluous, its presence would be decidedly injurious, in brackets of this character. Yet, we doubt whether the average engineer could deny himself the gratification of constructing one; two L's and a gusset plate having an almost irresistible charm for the modern man of iron. Facts, figures, and exact inferences are said to be his forte, but he has his weak points, nevertheless. One of these is his apparent inability to differentiate between a technical use of iron *per se*, and the modifications necessary when it is used as an auxiliary support in connection with a material of wholly different characteristics. With him, the exigencies of steel receive more than their due share of attention, while those of the terra-cotta remain a secondary consideration. Rightly understood, the two materials are coordinate in the order of their importance, and must be considered inter-dependent.

A terra-cotta bracket, such as that now before us, would be made with one horizontal partition, dividing the interior into two longitudinal chambers. By merely filling these chambers with good concrete, its strength would be materially increased. But, if a piece of I or T section is inserted (as at Fig. 54) and the concrete then rammed in so as to produce mechanical contact, the resulting bracket could be made stronger than the capacity of the wall from which it projected. We do not, of course, suggest that such additional strength is at all necessary in the one under notice, and for that reason nothing of the kind has been indicated in the drawing, but in many cases this will be found a simple expedient, and one which can be conveniently and effectively applied.

The tensile (or tortional) strength of a well-made terra-cotta bracket is much greater than is generally supposed. This statement will appear more explicit if taken in connection with a few of the many tests on which it is based. A cornice modillion made by the Northwestern Terra-cotta Company was tested in the manner shown at Fig. 58. Measured at the wall line it is 11½ ins. high, 8 ins. wide on face, with a projection of 2 ft. It carried a weight of more than 2 tons; but what the breaking strain would have been remains an unknown quantity, there being no more castings at hand wherewith to increase the load.

A much smaller modillion made under other conditions, by different men, from clay mined one thousand miles distant, was similarly tested at the works of the New York Architectural Terra-Cotta Company. It is but 5½ ins. high, 6 ins. wide at wall line, and has a projection of 14 ins. Allowing the same thickness of shell, this would be about half the sectional area, but with more than half the projection of Fig. 58. It was loaded in the manner shown at A, Fig. 59, until it broke at wall line under a weight of 2650 lbs. Another bracket pressed from the same mold was afterwards inserted where this one had been, and loaded to the extent of 2,400 lbs., which weight it has sustained for more than a month. It is still intact at date of writing.

The former of these modillions was slipped a cream white on a buff body, and is now used in the cornice of a building in Buffalo.

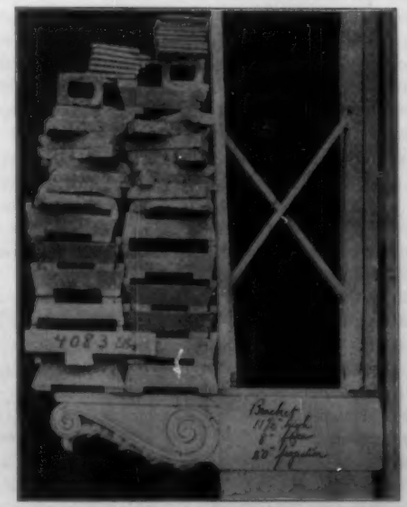


FIG. 58.

The latter was pressed from a clay which, when burned, is an excellent match for Indiana limestone. It was an over, left from a number used on the Delmonico Building, Fifth Avenue and 44th

Street, New York. No concrete filling or extraneous support of any kind was resorted to; the intention being to obtain the breaking strain of the bracket itself exactly as it came from the kiln.

A slightly larger bracket made of different clay was built into wall and loaded with pig iron, as shown at B, Fig. 59. It carried a

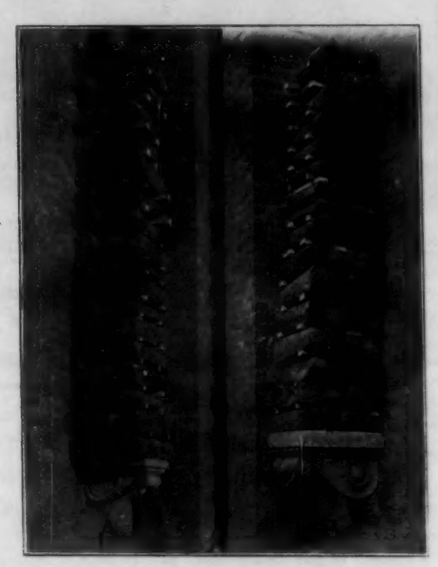


FIG. 59.

weight of 3,200 lbs., but its ultimate capacity could not be reached without endangering the wall from which it projected. This bracket was an over from the main cornice of the Citizens' Bank, Norfolk, Va., made from a clay mixture that burns to a light shade of red. Consols used under balconies being, invariably, much deeper, with at least three times the sectional area of these examples, could not be tested to their full capacity in the absence of special appliances. These comparatively slender cornice modillions were therefore chosen for the greater convenience of loading. The data obtained can, of course, be used as a basis on which extended calculations may be made. Other tests are contemplated and, if made, the findings will be communicated without reserve; but these, we think, are sufficiently conclusive, so far as the safe support of balconies is concerned. Meanwhile, the foregoing results, together with legitimate inferences to be drawn from them, are placed at the disposal of architects and engineers, for whose information these tests have been made.

It will be noticed that the balconies with which we have just been dealing are in connection with comparatively thick walls, a favorable condition of which full advantage has been taken. Archimedes was quite safe in his offer to lift the world on a lever, if anybody would but find him a place whereon to rest it. In like manner, we stand prepared to construct a terra-cotta platform, the carrying capacity of which shall be limited only by the thickness and weight of the wall from which it is projected. This proposal is less extravagant, but more capable of practical fulfilment, for, as will be observed, there is no *if* in it. Thick walls, however, are the exception in these days, and so we are forced to devise some way of dealing with walls in which steel columns and girders come within 4 or 8 ins. of the face.

An example of this kind is shown at Fig. 60, which, taken in connection with the engineer's skeleton (Fig. 61), will serve as a typical illustration of the class to which it belongs. Here the main columns of a fifteen-story building would not allow the consols to bond into wall more than 4 ins., an unfortunate, but it would seem unavoidable circumstance. Had this not been so, they would have entered the wall at least 16 ins. When properly anchored in that position there would then have been no excuse for the otherwise inevitable steel triangle. Even as it is, we think that this triangle might have been dispensed with, arrangements being made whereby the consol would have been bolted directly to the face of column. The gusset plate, at all events, could have been omitted. The diagonal strut would then have passed through a slot in the consol, connection being made with the longitudinal I beam before setting the egg and dart course between it and the top bed of consol. Considering the enormous tensile strength of the slender modillions under an eccentric load, as demonstrated in Figs. 58 and 59, some idea may

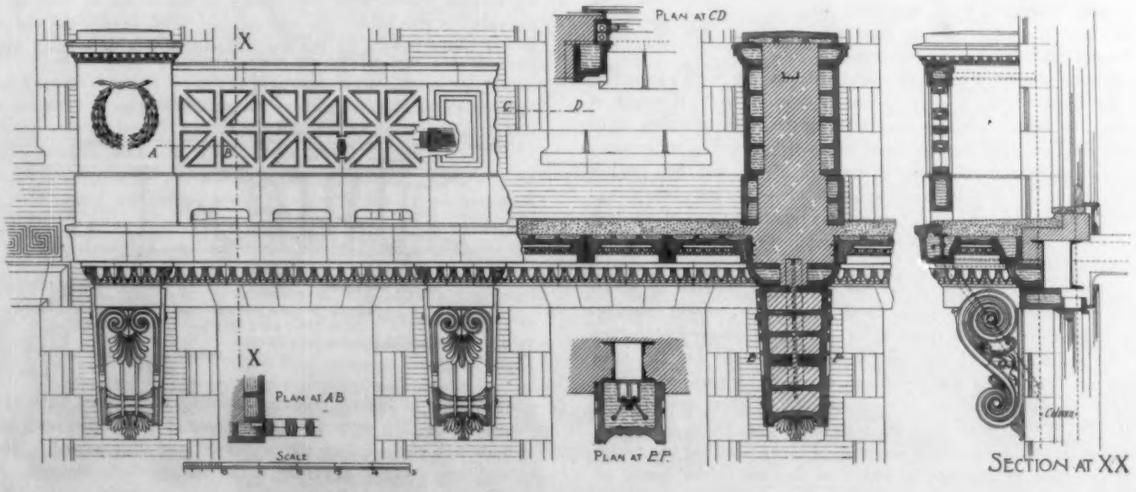


FIG. 60.

be formed as to the capacity of consols in which the conditions are reversed, and that on the side of increased strength. With little projection in proportion to its height the strain is changed from tortion to one of compression, 5 tons being a safe load for each consol.

This, we contend, would have justified the omission of the steel triangle altogether, allowing the platform to rest on the seven terra-cotta consols, which were spaced on rather less than 9 ft. centers.

As it is, these consols had to be slotted out from the back and when finally placed in position, the cavities on each side of gusset plate filled with cement. In this way they are, of course, rendered quite secure, but they would have been equally so, and in themselves much stronger, had the steel triangle been omitted, and the terra-cotta consol allowed to remain intact. Indeed, the undoubted strength of the steel triangle was very largely neutralized by the weakness imposed on the terra-cotta consol. In work of this kind the use of steel is permissible only in so far as it is absolutely necessary, and then in such way as will not make a sacrifice of the material it had been intended to supplement. Otherwise, we are merely adding strength with one hand and taking it away with the other.

The steel framing for a balustrade of this kind should be fitted together temporarily and have some of the connections made with bolts instead of rivets. This would admit of its being taken apart at will, and reassembled simultaneously with the terra-cotta, in such order of precedence as may be found most convenient at the time of setting. If the iron contractor allows his energies to get concentrated too closely on the completion of his own work, he is liable to forget that clay loses its plasticity once it has been burned. He should remember that though the most ductile of materials in its natural state, it becomes one of the most refractory when made into terra-cotta. Iron or steel, on the other hand, can be framed, forged, or welded to the required shape; and secured by either bolts or rivets, with almost equal facility. Other things *being equal*, the readiest and most economical method must always commend itself. But when a contracting engineer takes a short-sighted view of his own immediate interests he is very likely to lose sight of that qualifying condition. In such cases the terra-cotta manufacturer may have good cause to remind him of the frog's admonition to the boys, "What is play to you is death to us." It would, of course, be highly advantageous to all parties, if, in addition to its many good qualities, the clay could be molded around an unnecessary or, perhaps, prematurely fastened network of iron and then fired *in situ*. Until that can be done we would advise the next best thing: consultation and cooperation between the representatives of the iron and the terra-cotta contractors, the architect's decision being accepted on all sides as final.

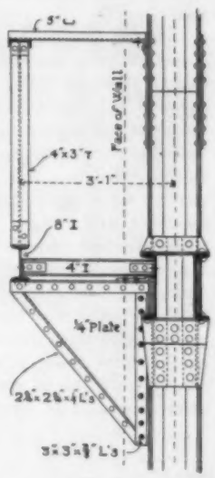


FIG. 61.

We have recommended the use of another material to which some of the preceding remarks do not apply; *viz.*, cement concrete. Full advantage has been taken of its setting and adhesive properties in the construction of this and similar platforms. Let the open chambers be tamped full, the rough edges of the partitions taking hold of the matrix, and we have a monolith of great strength and durability. This work, with its surface of granolithic, should be done, preferably, by men well accustomed to the handling of cement. The problems of the age in which we live are in the hands of specialists; even the more scientific use of cement has grown into a separate industry. Those engaged in it are more likely to have men of experience, the right kind of material, and — which is equally important — improved mixing machines at their disposal. A combination of these is, in itself, a sufficient guarantee against surface cracking; the result of either poor material or poor workmanship — two things that seem to have a curious affinity for each other.

Fire-proofing.

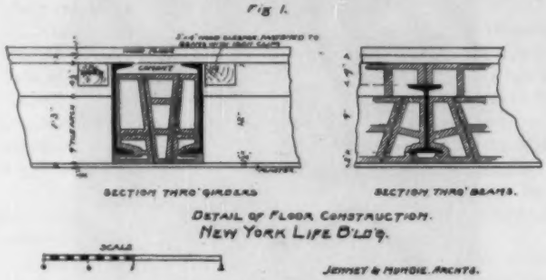
FIRE-PROOFING WITH BURNED CLAY.

BY W. L. B. JENNEY.

THE fundamental question is — What constitutes a good fire-proofing? First, it must protect the steel from becoming injuriously heated.

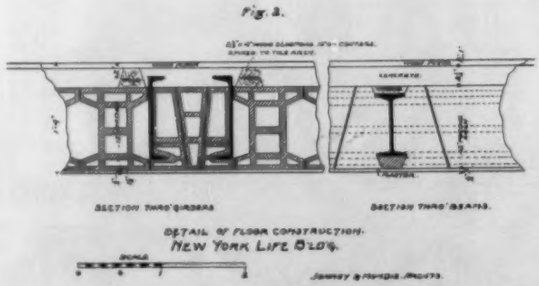
Second. It must be capable of resisting serious injury, both by the fire and by the fire department at the same time. There is a great difference in fire-proofing materials in this respect. There are some burnt clays that will readily stand the high temperature of the fire, and if allowed to cool slowly would sustain little or no injury, but will, if subjected to the dash and force of cold water while at a high temperature, suddenly contract and crack and be washed off. For example, in the Pittsburgh fire of May, 1897, the lower web of the floor arches scaled off, and many columns, and the lower flanges of beams, were partially stripped of their fire-proofing. The Board of Experts employed to examine the injuries to the building attributed the injury to the fire-proofing to other causes, such as movement of the building, with which I do not agree.

Fig 1.



The writer had occasion to examine the injury to the side of the Schiller Theater after the burning of the adjoining building on the east. A part of the side wall exposed to the heat of the fire and to the water thrown by the fire department was of pressed brick — other parts of hollow fire-proof building tile. They were both affected alike. The outer 1 in. in thickness of the pressed brick and the outer web of the hollow tile scaled off and disappeared. Similar conditions obtained at the fire in the Athletic Club, Chicago.

Fig 2.



The lessons taught by these fires are: —

First. The material must be such that it will successfully withstand at same time heat and water. There is plenty of such material. For example, the linings of coke ovens. When all aglow water is poured into the furnace from a 5 in. pipe without material injury to the lining. What is known as porous terra-cotta usually stands well if the clay is good. It is manufactured by adding six parts of

sawdust to four parts of suitable fire clay. The material can be easily tested by heating and plunging into water, which test should always be a part of the specifications, so there is no excuse for using an improper or defective material.

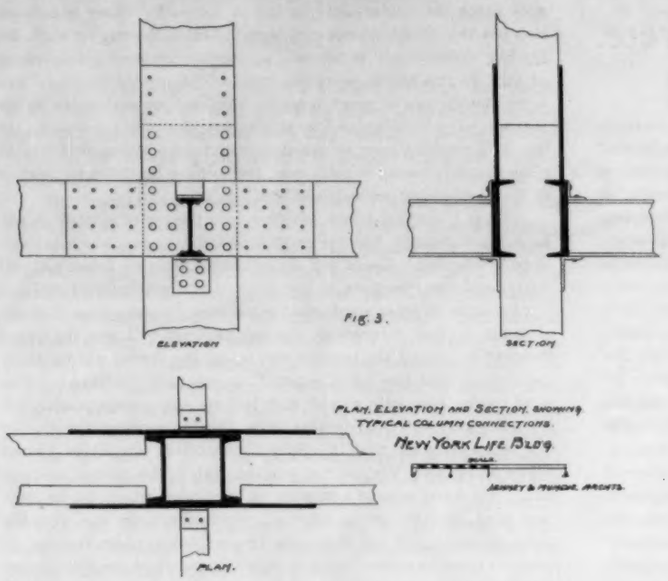


Fig. 3.

Second. Much care should be given to the shapes that they shall thoroughly protect the steel and be themselves thoroughly and substantially secured in place and protected from injury. The fire-proofing should not be liable to be washed off by the shock of the stream of water from the fire engines. To this end it is best to have smooth ceilings, that is, without panels, as the projection of the girders below the beams, paneling the ceiling, introduces an element of weakness in the lower flange protection of the girders that are not as firmly secured when they project as when they do not.

Figs. 1 and 2 are sections of the floor of the addition to the New York Life Building, Chicago. Two channels were used as the girder in order to secure a very rigid connection with the columns (Fig. 3) as all the wind bracing is thus provided for, doing away with the necessity of any other interior bracing, so difficult to manage without serious inconveniences. The interior fire-proofing of the double channel girders is by special shapes.

In Fig. 1, 9 in. tile arches were proposed. The sleepers to which the floor was nailed rested directly on the beams and were secured by steel clamps. Tile furring was proposed between the sleepers. Further study and discussion of the subject suggested Fig. 2, where a 12 in. arch was used, and in order to firmly secure the floor sleepers a strip of wood 1½ ins. thick was shaped and secured to the top flanges of the beams by steel clamps. To this strip the floor sleepers are spiked so as to be well secured and not liable to move by the usage of the floor, as has often been the case when the sleepers were simply bedded in the concrete over the arches.

Fig. 4

On presenting the two diagrams for proposals it was found that Fig. 2 would cost something less than Fig. 1, and as it was in all respects satisfactory, it was adopted.

For the protection of the columns Fig. 4 was used, every tile being thoroughly clamped to those above and below and around the columns. For a warehouse something more is required. Fig. 5 was used at the Fair, a great department store.

All the fire-proofing was set in a mortar composed of one part Portland cement and three parts best lime mortar, using only clean Lake Shore sand; all tile in dry weather to be wet before laying.

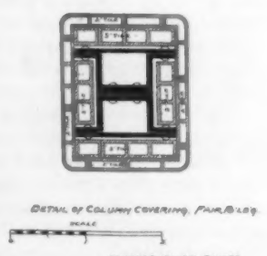
The concrete on the arches and between the floor sleepers is composed of one of Portland cement, three of clean Lake Shore torpedo sand, and four of aggregate; the aggregate to be composed of broken stone (other than lime stone), broken blast furnace slag, or waste brick or fire-proofing broken to go through 2 in. ring in all directions. This concrete to be pounded hard with a tamper weighing 40 lbs., with a cast-iron head 8 ins. by 8 ins. face. No cinders to be used.

The Pittsburgh fire showed the worthlessness of cinders in fire-proofing; they are consumed in a fire and offer no protection. Limestone would be burned to quick lime, would slack and destroy the concrete.

At a meeting of the Clay-Workers, Mr. Gates, president of one of our terra-cotta companies, offered a suggestion that can be made valuable for columns and for wall finish when terra-cotta can be used for the finish. "Make the terra-cotta the fire-proofing."

Here is an opportunity for a valuable innovation for exterior work and for the interior of a railroad station, a grand hall, etc., etc. The entire surface, however ornamental it may be, can be of terra-cotta that at the same time serves as fire-proofing. The material must be capable of satisfying the conditions of good fire-proofing material. It should be uninjured by heating to redness and then plunged into cold water. Great care should be taken with the anchorage that none of the pieces under any conditions that are likely to obtain can possibly be knocked off or put out of place.

Fig. 5



Good fire-proofing must not only save the steel from injury, but should itself pass through the fire uninjured.

One of the lessons learned from the recent fires is that while the steel was substantially protected from injury the fire-proofing was itself destroyed, entailing a severe loss to the underwriters. This is not as it should be, nor is it a necessity, and should be avoided.

Most plastering is worthless after it has gone through a fire. Plaster of Paris is of itself worthless under the conditions of heat and water. It becomes permanently soft and washes away. Therefore no partitions of plaster of Paris blocks should be used; although they do not burn, they are destroyed in a fire and increase the loss. An excellent fire-proof plastering is coming into use; it is known as asbestic, and is composed of lime mortar to which a large proportion of asbestos is added at time of using. It can be hardened and improved by the addition of Portland cement. Further experiments should be made with this material.

THE British Fire Prevention Committee, embracing in its membership many of the leading architects of Great Britain, and which has for its main objects the use of its influence in every direction towards minimizing the possibilities and dangers of fire, and to bring together those scientifically interested in the subject of Fire Prevention, has issued, in pamphlet form, the paper, by Mr. Francis C. Moore, on "How to Build Fireproof," recently printed in these columns.

Masons' Department.

Mortar and Concrete.

QUALITY OF MORTAR.

NEARLY all of our modern masonry constructions, and certainly all brickwork, is built on the assumption that the individual blocks, whether brick or stone, are to be imbedded in a matrix of mortar, uniting the whole into a homogeneous mass. As a matter of fact this assumption is rarely perfectly correct, for the reason that the mortar, though forming the key to the strength of the whole wall or pier, and, consequently, of extreme importance as a factor in building operations, very often fails to receive the proper care, and a scientific knowledge of the properties of the material is often sadly lacking on the part of our builders. It is encouraging to notice, however, how much advance has been made in a comparatively few years in the uniformity of the product which is used in our more important buildings. The old-fashioned way of preparing mortar was to burn the lime in a more or less crudely constructed kiln, and to mix the materials as they were required on the job in small batches, the lime being partially slacked and then being immediately covered with a blanket of sand, theoretically to keep the heat in, but practically checking the thorough slacking of the particles. Then the mortar, whether with lime or cement as a base, was worked over by hand on a board close to the wall, and the brickwork was laid up with very little attention to anything except to get the material in place.

The necessities of modern building operations, no less than the scientific study which a few of our best builders have devoted to the subject, have resulted in a modern compound specifically known as machine-mixed mortar, which is so far ahead of the average product which we were formerly obliged to depend upon that, though it has not achieved perfection, and the results are not as good as were brought about by the Roman methods of centuries ago, it is a vast improvement over the average hand-mixed mortar. Unfortunately, this machine-mixed mortar cannot be obtained in all cities. It has been used a great deal in New York, and to a certain extent, we believe, in the other large cities, but as far as we know, it has not been found practicable to ship it to any great distance without increasing the cost over hand-mixed mortar; though if considerations of the quality of the work were to be put above a matter of a few cents per cubic yard in cost, it would be far better for the builders in our small towns to have the machine-mixed mortar shipped to them. The cost is claimed to be some twenty-five cents per thousand bricks less than the average cost of hand-mixed mortar, while it is claimed that an additional saving of twenty-two cents a thousand can be effected in the labor of laying the brick.

It is extremely satisfactory to feel that a good material, which is a decided improvement upon old methods, results not only in a better construction, but in a distinct saving of money. We should be inclined to look upon it another way and urge that even if the cost were thirty or forty cents more per thousand bricks, it would be well worth the difference to use machine-mixed mortar. This, of course, is on the assumption that the quality of the mortar is uniform and is kept up to high standard. It is much easier to do this mechanically than by trusting to manual labor. Any one who has watched the ordinary laborer mix mortar will undoubtedly appreciate how very variable the quality is. A bricklayer will try to judge of the mortar by the way it feels under the trowel. We know of one instance where an attempt was made to ascertain how much value could be placed upon such means of judgment. Three mixtures were made, one with two parts of sand to one part of Rosendale cement, the second with three parts of sand to one of cement, and half a portion of ordinary loam; the third mixture was one part cement, one part of loam, and four parts of sand. The color of the mortar in each case was so nearly the same as to be difficult to distinguish. Three bricklayers, to whom these batches of mortar were submitted, united in declaring that the one with equal parts of cement and loam was the best, their judgment being based simply upon the smoothness with which the mortar could be laid in the wall. There is no question but that if the utmost care were taken to thoroughly slack the binding material and to properly proportion the sand, giving plenty of time to the whole operation, hand-mixed mortar would be perfectly satisfactory in every respect; but such conditions rarely obtain in a large building, and by mixing machine-mixed mortar by the ton it is perfectly easy to maintain exact proportions, to have the binder equally strong in each case, and to have the intimate mixture of the components perfectly uniform.

There is another factor entering into the use of mortar, or perhaps, more properly, into the construction of masonry, which is liable to be overlooked. There is a saying among what we sometimes call the old-fashioned builders, to the effect that a wet building makes a dry house, or, in other words, that in a masonry construction, if plenty of water is used throughout, the bricks kept well wet, the joints thoroughly grouted, the result in the set of the mortar will be vastly superior to what one would expect from opposite conditions. This is, of course, especially true of work laid up with cement mortar, but it applies with very considerable force, also, to lime-mortar work. It is a common belief that in cold weather bricks should be heated before being set. We are not sure that this is the correct assumption. We have noticed a number of times that where bricks have been used hot the mortar, after a few months, is dry and crumbly under the hand, and has the appearance of having been frozen. It seems to stand to reason that hydraulic cement which requires a very considerable excess of water to set properly would have the life all drawn out of it by being set in bricks, which not only are free from water, but are heated so that they would absorb all the free water from the cement. It, of course, is not always practicable, on account of the cold, to wet bricks in winter time, but from personal experience we should be inclined to say that a wall would stand better if the bricks were laid up cold in winter than if the bricks were first heated. And certainly for any work in ordinary weather the liability is that it will be kept too dry rather than too wet.

We had occasion to notice a while ago an instance of the efficacy of the liberal use of water in this connection. In a certain prominent building in this city the door trim and the dado work were all constructed of Portland cement applied directly to fire-proof partition blocks. After the work had been run there came a spell of quite dry, hot weather, and the building was left open, with the result that when the cement work had the appearance of being dried out it was so soft and porous that it could be brushed away with a broom, and there was hardly any surface to it. The builder was shrewd enough to try some experiments before going to the expense of removing the whole. He stationed a number of laborers around the building with pails of water and big sponges, and instructions to wet the cement work down thoroughly and keep it wet. This treatment was continued for, if we remember rightly, some ten or twelve days, when the cement began to harden, and in a few days more it had set up in a perfectly satisfactory manner, and ultimately proved to be an exceptionally strong piece of work. We have no doubt that much of the poor mortar that is encountered in taking down old buildings owes its friability and seemingly poor texture to the fact that not enough water was used in the construction.

MATERIAL MAN.

THE Supreme Court of California holds that one who agrees to furnish certain mantels, tiles, and grates, and the appurtenances of same, for a building, and to deliver and set them in position, is a material man, and not an original contractor, within the meaning of the mechanics' lien law of that State.

The same court also holds, a person contracting to furnish doors, sashes, blinds, etc., which, instead of manufacturing to order, he purchased ready made, is a material man only.

Hydraulic Cements.

BY CLIFFORD RICHARDSON.

(*Continued.*)

Necessity of Keeping Cement Work Moist or Not. The necessity of keeping all work done with both kinds of hydraulic cement moist and supplied with water for a long time after setting, in order to aid in the hardening process and to prevent drying out and air cracking, is apparent.

It is found that the final strength which different cements attain in the process of hardening does not correspond at all to the celerity with which they first set. A quick-setting cement, which may show a great strength in a few hours, will not ordinarily compare, after the lapse of a month or more, favorably with one that is slow setting, while Portland cements harden much more rapidly than natural cements, although setting much slower. In this respect there is, however, a considerable variation in different brands, and those are usually considered most desirable which continue to harden after long intervals of time. For example, the American Portlands seem to gain most of their strength in a few weeks, while the German brands will, many of them, be inferior in strength to them at seven and twenty-eight days, but will continue to increase for nearly a year afterwards, and finally attain an equal strength. It is also worthy of note that there is a variation in the way in which cements, especially the natural ones, set throughout the mass, some hardening first on the exterior and others on the interior.

Effect of Variations in Composition in Portland Cement. Even within the narrow limits of composition for good Portland cements, already given, there is sufficient opportunity for variations to produce decided differences in character, some of which have been noticed. The set is much influenced by the amount of lime, especially when the cement is underburned, or by a large amount of alumina. As has been said, the more lime a cement contains the more difficult it is to bring about proper and complete combination in burning, and the higher the temperature and the longer the heat that is required. When perfectly made the high-limed cements are much slower in set, stronger and better for ordinary use, although they will not stand such immediate immersion in water as a low-limed cement will, and are, therefore, less suited for use where water is present. They are, however, most in demand for ordinary construction, and are especially satisfactory for sidewalks and work where a sufficient time must elapse before setting to allow of the placing of the material properly. Cements high in lime, which are not thoroughly burned or seasoned, are generally very quick setting, hot, and unstable, as are those which contain too much alumina or are over-clayed, as it is called. They have a tendency to expand and to blow or check, which is one of the faults of inferior Portland cement to be most carefully guarded against. The presence of magnesia is also supposed to bring about expansion after the lapse of a considerable period of time, while sulphates, as well as magnesia, are considered to be the causes of the disintegration of Portland cement in the presence of sea water.

Cements low in lime are sometimes found which, without an excess of alumina, but with more silica, are merely deficient in strength like underburned cement. A cement with 64 per cent. of lime is a highly limed one, with 65 excessively so, with less than 60 very low limed, and with 62 to 64 a normal cement. Alumina above 8 per cent. is high, below 5 very low. Magnesia above 3 per cent. is excessive, and above 2 high, while sulphuric acid above 1½ may demand consideration.

The amount of the two latter constituents ordinarily found in Portland cement can be seen in the following determinations in cements actually in the American markets during the past few years: —

Magnesia and sulphuric acid in Portland cements: —

MgO.	SO_3
.86	1.25
2.79	.71
1.81	1.24
1.45	1.11
1.69	1.50
2.48	1.36
2.84	1.53
1.16	2.71
2.73	1.51
1.85	.39
1.32	1.82

Magnesia is usually below 2 per cent., and sulphuric acid not higher than 1½.

(*Continued.*)

STABLE SUBSOIL FOR FOUNDATIONS.

INVESTIGATIONS preliminary to the foundations of a large building are seldom made with sufficient thoroughness. Our readers doubtless will recall the famous epitaph on the tombstone of an architect who was buried in Westminster, which reads: —

"Lie heavy on him, Earth,
He laid great loads on thee."

The amount of the loads arising from a great building, and their effect upon not only the immediate soil, but upon the subsoil, is often more considerable than we are aware of. Furthermore, even with the best of soil the conditions are sometimes such as require especial provisions to guard against trouble. Some years ago an apartment house of considerable size was in process of erection in Brooklyn, upon a street in a newly developed portion of the city which had been laid out over a line of low mounds or hillocks, the streets having been cut down very nearly to a level, so that the finished grade was only a short distance above the bed rock, and the foundations of the building were even closer to the substratum. The earth in this case was of a clayey nature, and after an unusually heavy rain which was allowed to soak in around the foundations and get down through to the rock, the whole structure, building, foundations, clay bottom and all, proceeded to slide down hill and finally ended by landing in a heap in the middle of the street.

There is a great deal more movement of this sort than people are aware of. It has been stated on excellent authority that the whole southerly slope of Beacon Hill, Boston, with the buildings upon it, has been gradually sliding down into the water at a rate which is only a few inches a century, but yet quite sufficient to be appreciable; and as the section which it is alleged is in process of transit is occupied at points by some of the heaviest structures in the city, it may sometime become a question as to how far this species of loading can be safely carried when imposed, as in this instance, upon a sloping substratum of rock. In the more recent New York tall buildings it has been the custom to assume that the soil was worthless to resist the loads, and the foundations have accordingly been carried clear down to the bed rock. In Chicago, on the other hand, most of the large buildings are floated upon a relatively thin and by no means very firm layer of alluvial deposit. The Chicago buildings settle a good deal, the average Boston building settles slightly, and usually unequally, while the more recent New York buildings do not settle at all. The latter is obviously the best result, though also the most expensive.

SURETY LIABLE ON BUILDING CONTRACT.

A PROMISE by the surety of a building contractor, to whom the contractor had assigned the money to become due under the contract, to pay the claim of a subcontractor, if the latter would continue the work, is without consideration, unless the work specified was something which the subcontractor was not required to do by his contract, and is not binding on the surety unless it is in writing.— *Sup. Court, N. Y.*

Brick and Terra-Cotta Work In American Cities, and Manufacturers' Department.

NEW YORK. — The past month has been undeniably dull in this city, not only in regard to new building projects, but in every branch of the real-estate business. There is very little new work in sight, but no uneasiness seems to be felt by architects and builders, as both confidently hope for a brisk revival of business when peace is restored, and when other lines of business are as active as usual. We had hoped to see the demolition of the old reservoir at Fifth Avenue and 42d Street commenced this summer and work on Carrère & Hastings beautiful library building started, but there are no signs of it as yet, and probably nothing will be done during the Tammany administration. The Academy of Design, however, will be started at once, as it is not dependent upon the city for funds.

Among the new building projects might be mentioned: Dehli & Howard have prepared plans for a new building for St. Jerome Roman Catholic Church, to be built on 137th Street and Alexander Avenue; cost, $100,000.

McKim, Mead & White have planned a five-story brick and stone dwelling for W. E. D. Stokes, Esq., to be built on 54th Street; cost, $100,000.

W. Wheeler Smith has planned a two-story brick and stone structure to be erected on the Roosevelt Hospital grounds; cost, $30,000.

Rossiter & Wright are preparing plans for a four-story brick studio building to be erected on 34th Street; cost, $15,000.

N. Le Brun & Sons have prepared plans for a six-story brick structure to be erected on East 76th Street, for the Academy of the Marist Brothers; cost, $50,000.

E. H. Kendall has completed plans for the eight-story addition to the Methodist Book Concern, Fifth Avenue and 20th Street.

Hill & Turner are preparing plans for a ten-story brick and stone apartment house to be erected at Madison Avenue and 53d Street.

Cleverdon & Putzel have planned a five-story brick mercantile building to be erected at Third Avenue and 20th Street; cost, $60,000.

Carrère & Hastings are completing plans for a three-story brick and stone residence to be built at Morristown, N. J., for Abraham Wolff.

Ernest Flagg is preparing plans for an addition to the Singer Building, to be of brick and stone; cost, $400,000.

H. T. Howell has planned a seven-story brick flat and store building to be built on the Boulevard near 91st Street; cost, $80,000.

W. C. Dickerson has prepared plans for three four-story brick flats to be built on Wales Avenue; cost, $60,000.

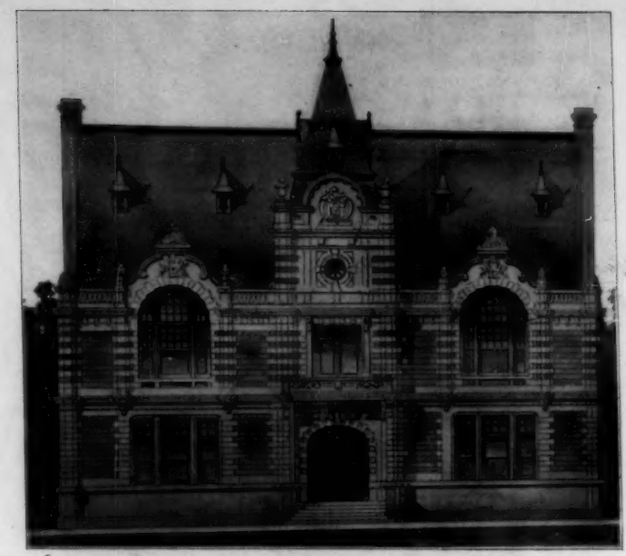
James E. Ware & Son have planned a brick and stone flat building; cost, $25,000.

McKim, Mead & White have planned a six-story brick store and loft building to be erected at 300 Broadway; cost, $110,000.

CHICAGO. — Between war and the strikers Chicago architects are feeling blue. The cut-stone difficulty, described a month ago, was apparently settled by an acceptance of the old wage, — $4 per day of eight hours, and a minimum of four men instead of eight for every planer. But other troubles have arisen, and contractors predict that one will be unable to get even a plain sawed sill for a small residence. Another serious strike has been that of the wood-workers in sash and door factories. These have been among the last of craftsmen to succeed in organizing unions. Their present trouble seems to be settled.

The most remarkable strike that Chicago has seen is that of the stereotypers. It is notable because its result has been to prevent the appearance, for several days, of all the daily papers except the German publications. The publishers even closed their bulletin

PARK ROW SYNDICATE BUILDING, NEW YORK.
Photographed by Hall expressly for Central Fire-Proofing Company. Showing fire-proofing of domes and floors. This is the tallest office building in the world.
R. H. Robertson, Architect.



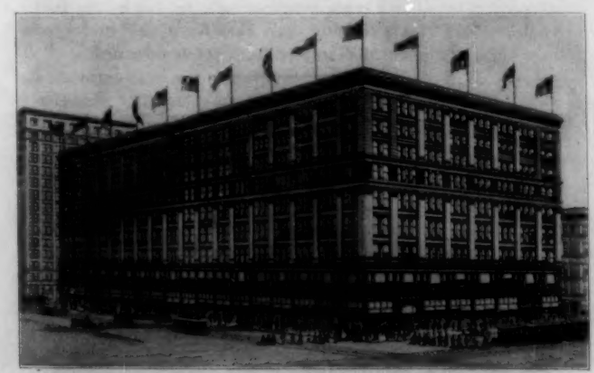
TOWN HALL, EAST ORANGE, N. J.
Details shown on Plates 49, 50, 51, 52.
Boring and Tilton, Architects.

boards, and Chicago people were wild for newspapers about the time Cervera's fleet was destroyed.

Another fire-proof mercantile or manufacturing building is announced. The building, designed by D. Adler, will cost $60,000, and be occupied by a wholesale tailor.

Shepley, Rutan & Coolidge have let contracts for a hotel at South Bend, Ind., the cost of which is given at $223,000. The building is steel frame and tile-arch construction. The exterior is Renaissance in design. The first story is stone, but the other five are brick with terra-cotta window trimmings, cornice, etc. The Chicago Hydraulic-Press Brick Company and the American Terra-Cotta and Ceramic Company are to provide the brick and terra-cotta.

An interesting alteration job is that of the Studebaker Carriage Depository on Michigan Avenue. By September this ten-story building will have been transformed (under the hands, very properly, of its original architect, S. S. Beman) into "The Fine Arts Building." There will be two music halls — one to seat 1,600, the other 700, and an assembly hall to accommodate 500. The building is intended to be a center for art, educational, and literary interests,



"THE FAIR" BUILDING, CHICAGO.
Exterior of terra-cotta bricks furnished by the Columbus Brick and Terra-Cotta Company.
Jenney & Mundie, Architects.

and is renting space to prominent sculptors and painters, to publishers like Harper & Bros., and D. Appleton & Co., and various periodicals, and to musical and art clubs.

Five hundred Chicago architects have paid each his $25 for a license, and now as each answers the call for his first annual $5 fee he sympathizes with the builder contractors who have to pay a like annual license fee. The plumbers, however, have to pay $30 per year, and at a recent date 800 out of 1,000 master plumbers were delinquent.

PITTSBURGH. — The general idea that almost nothing is being done at present in the building line does not seem to be confirmed by the report of the building inspector. While there are very few office or store buildings either in process of erection or being contemplated, the inspector reports that the number of permits for new buildings in June have increased 27 per cent. over those of 1897, while the valuation has increased over 43 per cent. As compared with last month, they have fallen off one in number but increased in valuation 10 per cent. This would indicate that a better class of dwellings are being built, and it is gratifying to note a large decrease in the number of frame buildings even in unrestricted wards, the majority being brick houses of from about ten to fifteen thousand dollars value.

Among the most important building news items at present are: The new six-story store and office building at the corner of 6th Street and Liberty Avenue. It is to be built of light sandstone and Roman brick, and cost $130,000; James T. Steen, architect. The new Kaufmann store on Smithfield Street, of stone and gray Roman brick; cost, $175,000; Charles Bickel, architect.

The new building for C. L. Magee, on Fifth Avenue, near Wood Street, is being built from plans by F. J. Osterling. The front is almost entirely of light-gray terra-cotta.

Alden & Harlow have recently let the contract for the Wylie Avenue branch of the Carnegie Library. It is to be built of brick and red sandstone, and cost, complete, about $40,000.

Among residences recently completed is that of Mr. A. M. Byers, in Allegheny. Although a double house, it is built to resemble a single house; cost, about $175,000.

The J. G. Jennings house on Fifth Avenue, East End, has also recently been finished; built of buff Roman brick and light terra-cotta; cost, $40,000. Alden & Harlow are the architects of both.

Boggs & Buhl are making a large addition to their department store in Allegheny. S. F. Heckert is the architect. Though constructed with a steel frame, wooden joist twelve inches apart are being used to support the floors,

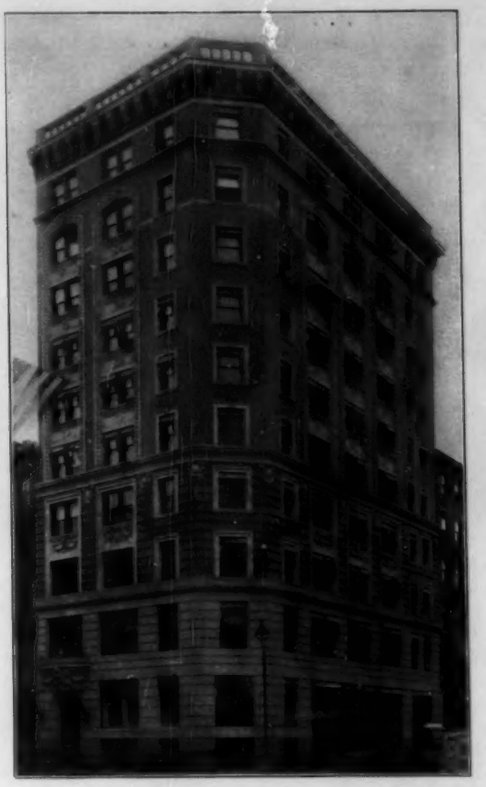
TERRA-COTTA COLUMN, CHAMBER OF COMMERCE, CLEVELAND, OHIO.
Executed by the Northwestern Terra-Cotta Company.
Peabody & Stearns, Architects.

TERRA-COTTA CAPITAL, OFFICE BUILDING, HOLYOKE, MASS.
Executed by the Standard Terra-Cotta Company.
Clough & Reid, Architects.

and have caused the writer to wonder whether the difference in insurance between this construction and that of a fire-proof floor would not in a few years have paid the difference in cost between the two constructions.

Geo. S. Orth & Bros. are at work on a brick residence for Col. A. J. Logan, on Fifth Avenue, East End. They have also prepared plans for a brick residence for W. L. Jones, on Forbes Street; cost, $25,000; a stone residence for W. A. Shaw, to cost $30,000; four houses for E. B. Alsop, to be built on Ellsworth Avenue, East End,

WATER TOWER, CHAPINVILLE, CONN.
Stone, Carpenter & Willson, Architects.



THE CONVERSE BUILDING, BOSTON.
Terra-Cotta furnished by the Excelsior Terra-Cotta Company. Face brick by the Sayre & Fisher Company.
Winslow & Wetherell, Architects.

and cost about $75,000; also for five houses for the Aiken estate, each to cost about $6,500. They have also recently let the contract for a stone residence for Miss Alice Hogg, to be built in Homewood; cost, $25,000.

J. C. Westervelt, of New York, has made plans for a brick colonial house for W. S. Kuhn, to be built on Forbes Street; cost, about $40,000.

F. J. Osterling is at work on the new insane asylum for Allegheny County, to be built at Woodville; cost, $200,000. He is also preparing plans for the new building for the Chautauqua Lake Ice Company. It is to be a brick, fire-proof building, 100 by 225 ft.

A competition has recently been held for a new twelve-room school building in the 22d Ward, but is, as yet, not decided.

CURRENT ITEMS OF INTEREST.

WALDO BROTHERS have been awarded the contract to furnish Atlas Portland cement to the town of Concord, Mass.

TERRA-COTTA DETAIL.
Executed by Gladding, McBean & Co., San Francisco, Cal.

TERRA-COTTA DETAIL, MT. VERNON HIGH SCHOOL, MT. VERNON, N. Y.

Executed by the Conkling, Armstrong Terra-Cotta Company.
Boring & Tilton, Architects.

THE NEW CATLIN BLOCK, HARTFORD, CONN.

Hollow brick used in this building supplied by the C. P. Merwin Brick Company, Berlin, Conn. Terra-cotta by the Excelsior Terra-Cotta Company, through their Connecticut representative, W. P. Felt, New Britain, Conn.
W. C. Brocklesby, Architect. Hopkins & Roberts, Builders.

NORCROSS BROTHERS are using Meiers Puzzolan cement in backing of light stonework at the Radcliffe Gymnasium, Cambridge, Mass.

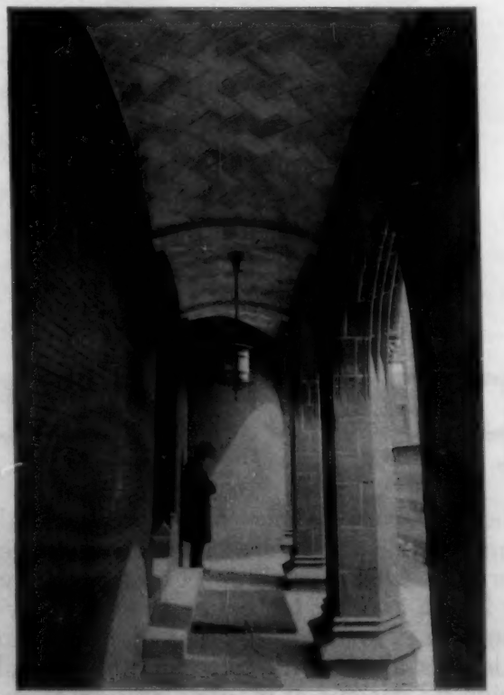
THE CUMMINGS CEMENT COMPANY, of Akron, N. Y., is furnishing their Storm King Portland for the fire-proof building now being erected by John Druecker, of Chicago.

WALDO BROTHERS are furnishing Alsen Portland cement to the Roebling Company for use on floors for Somerset Hotel, Boston, Mass.

THE AMERICAN CEMENT COMPANY, who have four works at Egypt, Pa., and one at Jordan, N. Y., have recently made shipments of cement to Siberia, and also to Mexico.

SAYRE & FISHER COMPANY are supplying through their Boston agent, Charles Bacon, ivory cream enameled bricks for the new swimming tank in Craigie Hall, Harvard College; Miss Josephine Wright Chapman, architect.

THE EXCELSIOR TERRA-COTTA COMPANY, through their Boston agent, Charles Bacon, is supplying the architectural terra-cotta for the new Home for Aged People, Cambridge, Mass.; Stickney & Austin and W. E. Chamberlain, associate architects.



CLOISTER (SHOWING GUASTAVINO CONSTRUCTION), ST. CHRISTOPHER MISSION HOUSE, NEW YORK CITY.

Barney & Chapman, Architects.

H. F. MAYLAND & CO., New York agents of the Burlington Architectural Terra-Cotta Company, have closed the following new contracts: Graphic Building, Fourth Avenue, New York City, Wm. J. Dilthey, architect; apartment house, 34th Street, New York City, George H. Van Auken, architect.

THE work of rebuilding the plant of the Illinois Supply & Construction Company, at St. Louis, recently destroyed by fire, is progressing in a very rapid and satisfactory manner. No inconvenience has been caused in the matter of filling contracts that they had on hand at the time of the fire, as plenty of bricks were left them uninjured.

THE BRICK, TERRA-COTTA AND SUPPLY COMPANY, M. E. Gregory, proprietor, Corning, N. Y., has been awarded the contract for furnishing the paving brick required for paving Main Street, Geneva, N. Y. They also have the contract for furnishing the architectural terra-cotta required for Telephone Building, Wheeling, W. Va., Rutan & Russell, architects.

THE BURLINGTON ARCHITECTURAL TERRA-COTTA COMPANY, Burlington, N. J., have received the following new contracts: residence, 33d and Diamond Streets, Philadel-

phia, H. E. Flower, architect; Holy Cross Church, Ninth and Lehigh Avenues, Philadelphia, Isaac Pursell, architect; new building, Zoological Garden, Philadelphia, Hewett Brothers, architects.

THE CELADON TERRA-COTTA COMPANY, LTD., will furnish their roofing tiles on the following new buildings: residence for H. T. Chandler, Cleveland, Ohio, A. N. Oviatt, architect; Science Hall, Syracuse University, Prof. Edward H. Gaggin, architect; residence for E. W. Swisher, Columbus, Ohio, C. A. Stribling & Co, architects; office building for International Bridge Company, Niagara, N. Y., R. H. Wallace, architect; residence B. W. Kauffman, Yost & Packard, architects; station for C. R. I. & P. R. Railway, Iowa City, Iowa, W. K. McFarlin, architect; station for same company at Atlantic, Iowa, W. K. McFarlin, architect; residence for W. H. Ensinger, St. Paul, Clarence H. Johnson, architect; Somerset Apartments, Boston, Arthur H. Bowditch, architect.

AMONG the recent contracts executed by the Berlin Iron Bridge Company is a new boiler house for the People's Light and Power Company, Jersey City, N. J. It is of fire-proof construction throughout with steel framework, brick side walls and iron roof covering; a new scrubber house at the 25th ward gas works; a new boiler and engine house at the Point Breeze Works; also a condenser and purifier building at the same location, all for the United Gas and Improvement Company, of Philadelphia, Pa. These buildings are of steel-frame construction, brick side walls and slate roof supported on metal purlins carried by clear span trusses; new buildings for the electric railroad plant of the Syracuse Construction Company, at Syracuse, N. Y. These buildings are all of steel framework covered with corrugated iron.

THE following new buildings have been furnished with the Shawnee brick manufactured by the Ohio Mining and Manufacturing Company, through their Pittsburgh agents, Burgy & McNeill: residence for W. A. Roberts, Pittsburgh, D. B. Morris, architect; Borrows Apartments, Pittsburgh, T. H. Scott, architect; residence for T. W. Bithell, Pittsburgh, A. K. Miller, architect; McGee Building, Pittsburgh, F. J. Osterling, architect; store building for Geo. W. Driver, Washington, Pa., John Vester, architect; residence for T. S. Morgan, Bellevue, Pa., E. M. Butz & Co., architects; residence for H. Robbins, Pittsburgh, Sidney Heckert, architect; two residences for J. H. Elder, Pittsburgh, Victor E. Kelley, architect; public school, Wilkinsburg, Pa., E. M. Butz & Co., architects; public school, Charleroi, Pa., E. M. Butz & Co., architects; Katterburg Building, Pittsburgh, E. B. Milligan, architect; Murtland Building, Pittsburgh, Alden & Harlow, architects.

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Fine Clay Property and Factory Sites.

Twenty-five hundred acres, within six miles of Baltimore, Md. A large part is underlaid with clays of fine quality and great variety, suitable for making red, buff, and other kinds of Bricks, Tiles, and Terra-Cotta. A railroad, running through the property, connects it with Baltimore and Washington. Water connection with Baltimore and Chesapeake Bay by channel fifteen feet deep. Good water power on property. Fine sites for Factories. Parts of property are suited for suburban development and parts for truck farming. For sale, as a whole or in lots to suit, on reasonable terms.

Also a small FACTORY, equipped for making roofing tiles and bricks.

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15 LIBERTY SQ., BOSTON, MASS.

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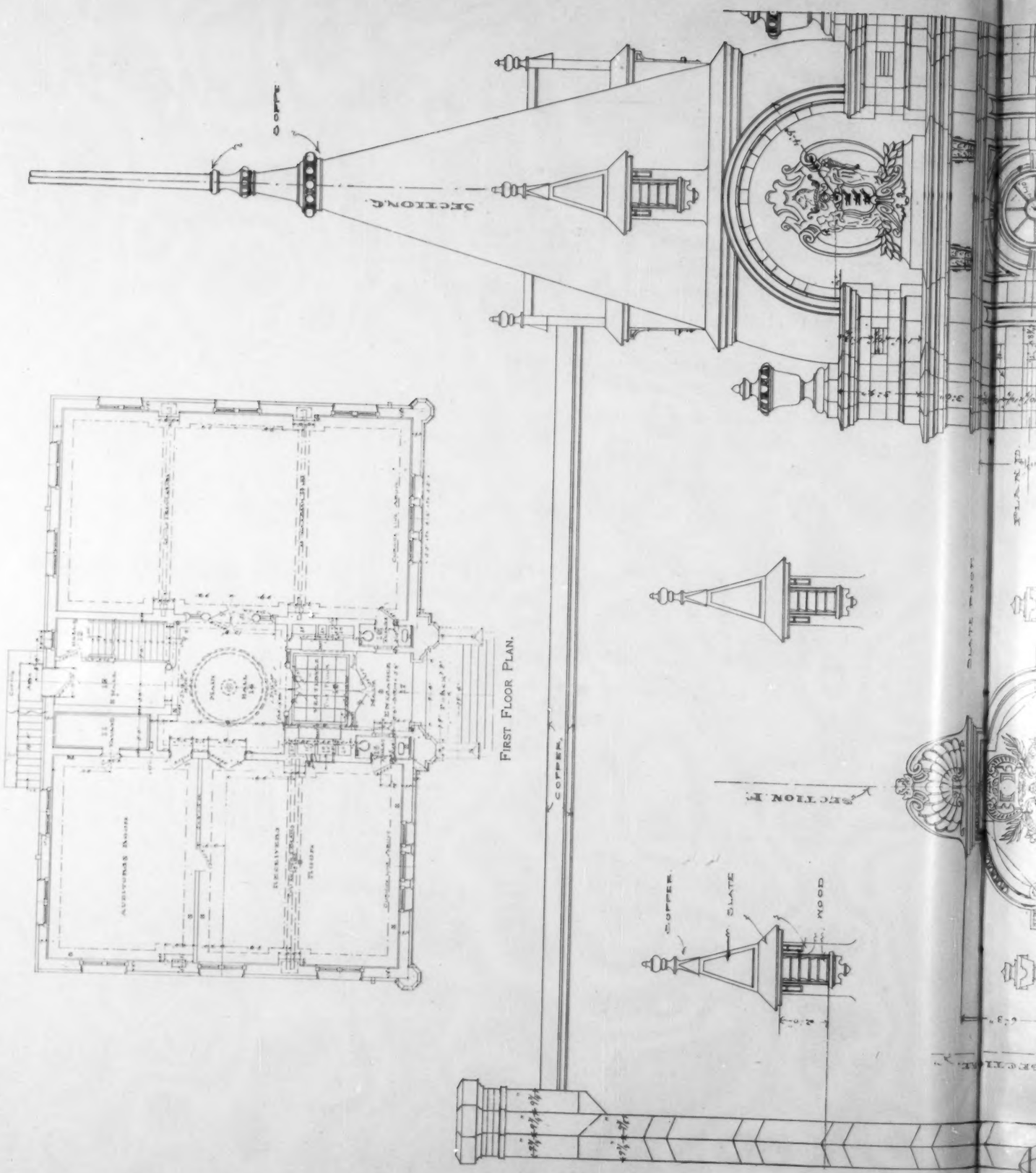
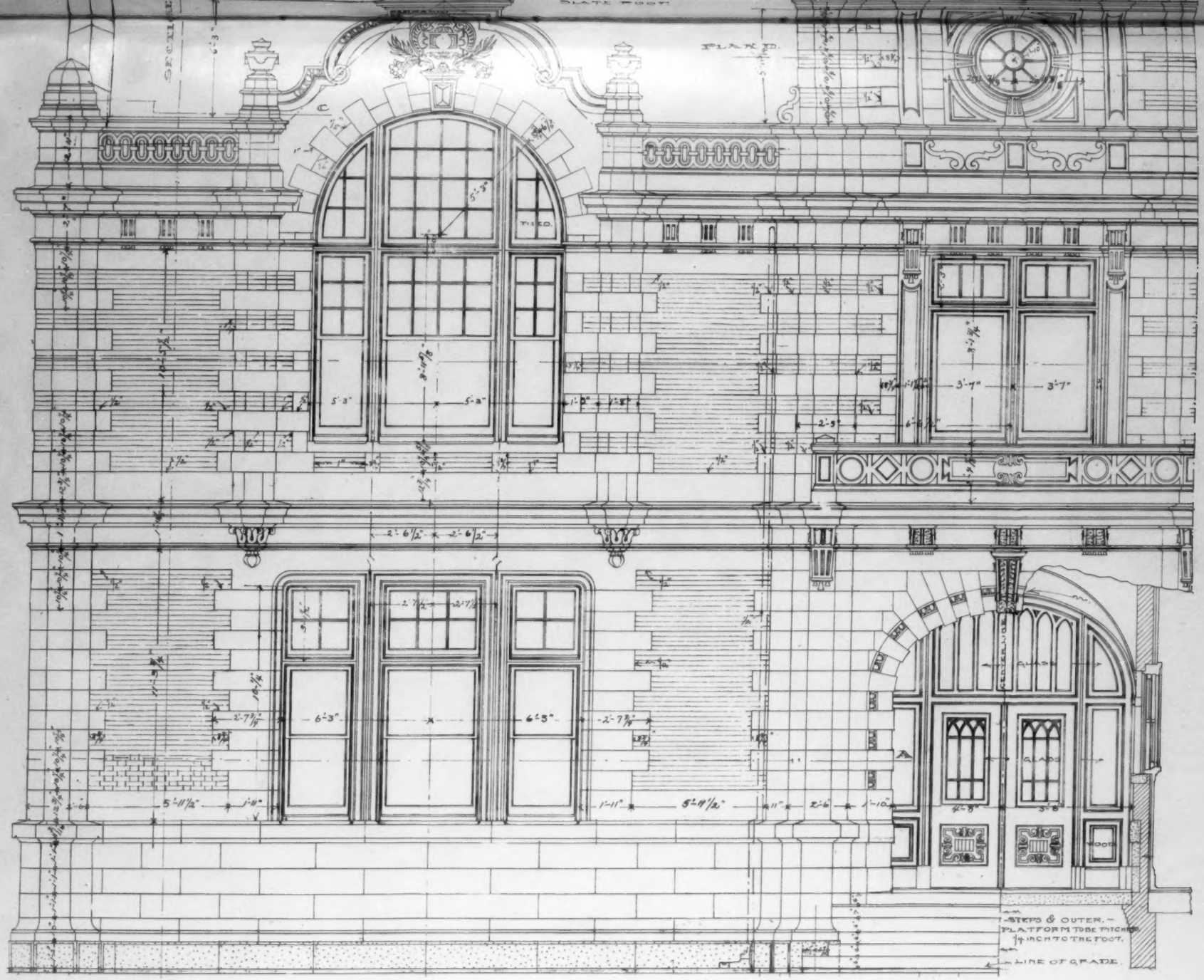


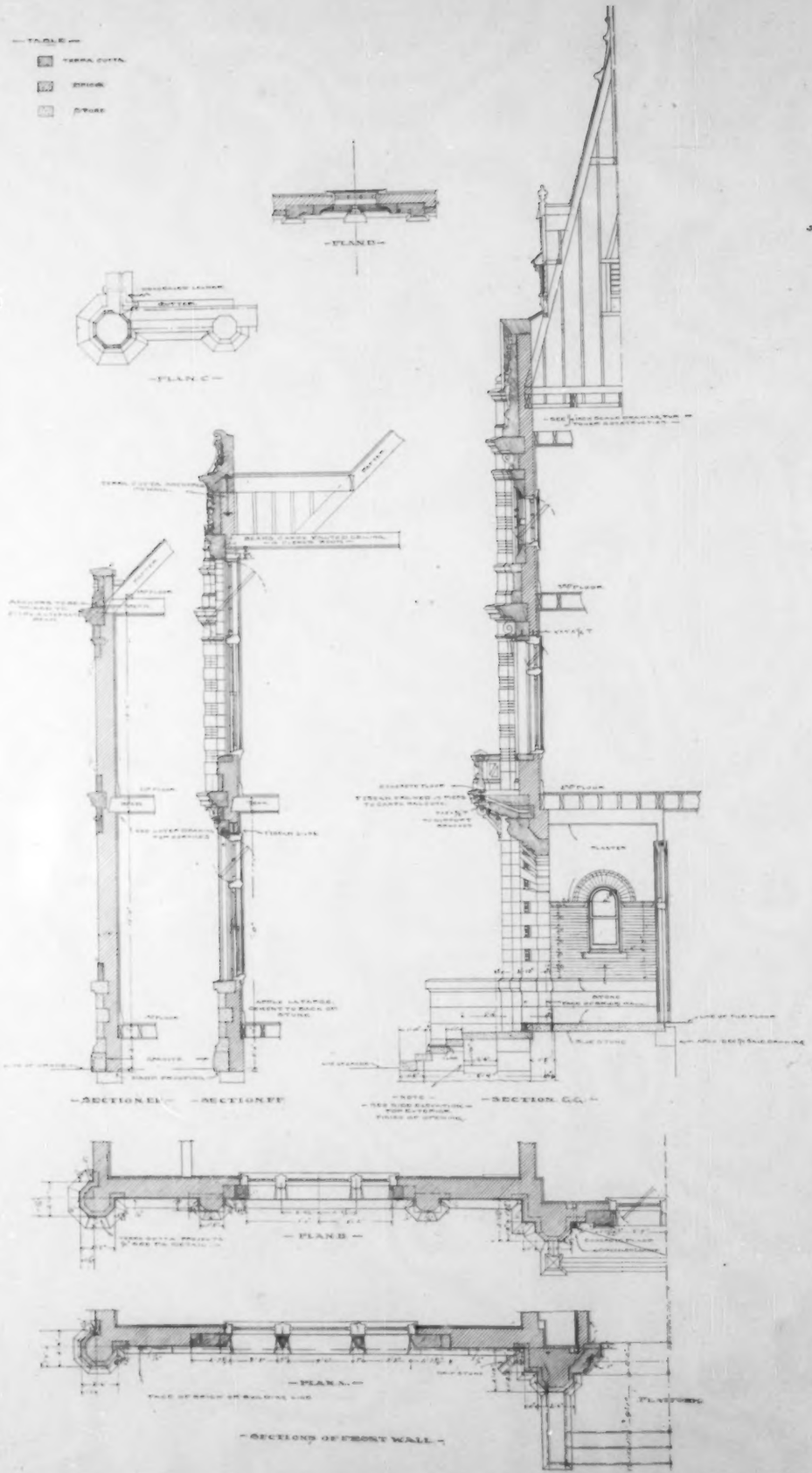
First Floor Plan.

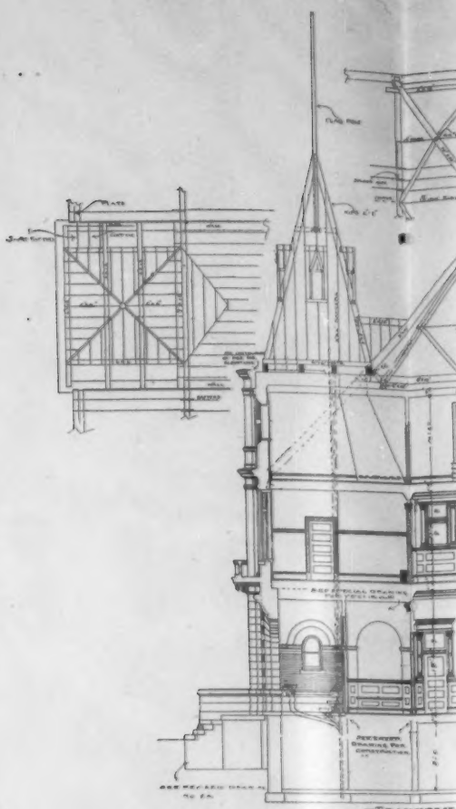


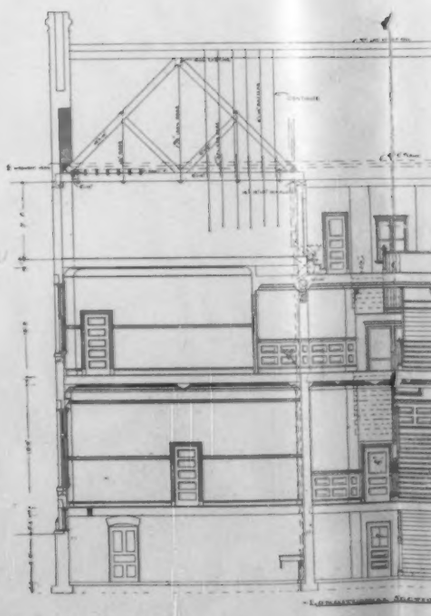
DETAILS, FRONT ELEVATION.

EAST ORANGE TOWN HALL, EAST ORANGE, N. J.

BORING & TILTON, ARCHITECTS.

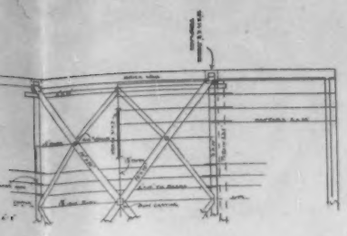


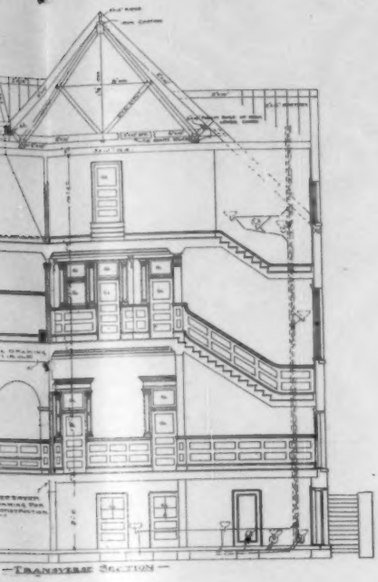




DETAILS, EAST ORANGE TOWN H

BORING & TILTON,





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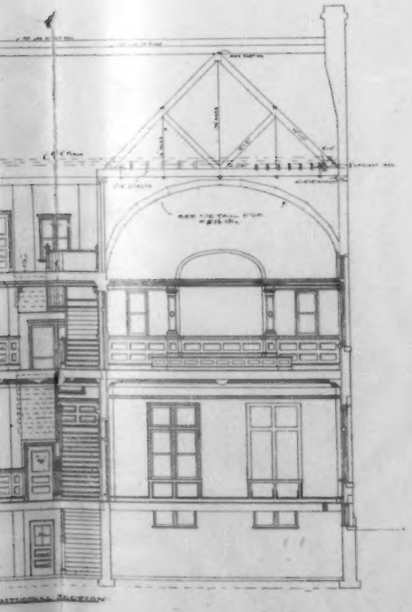

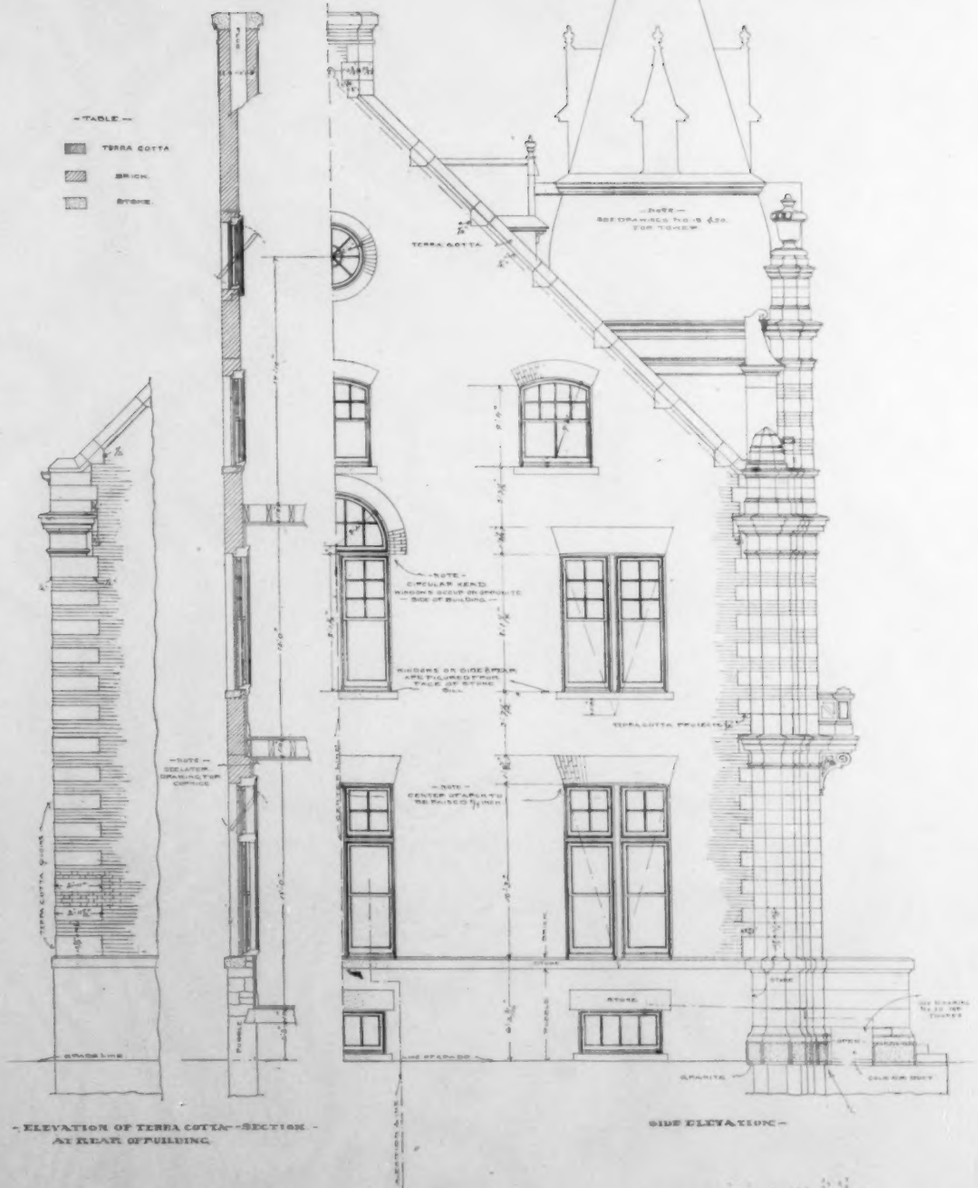

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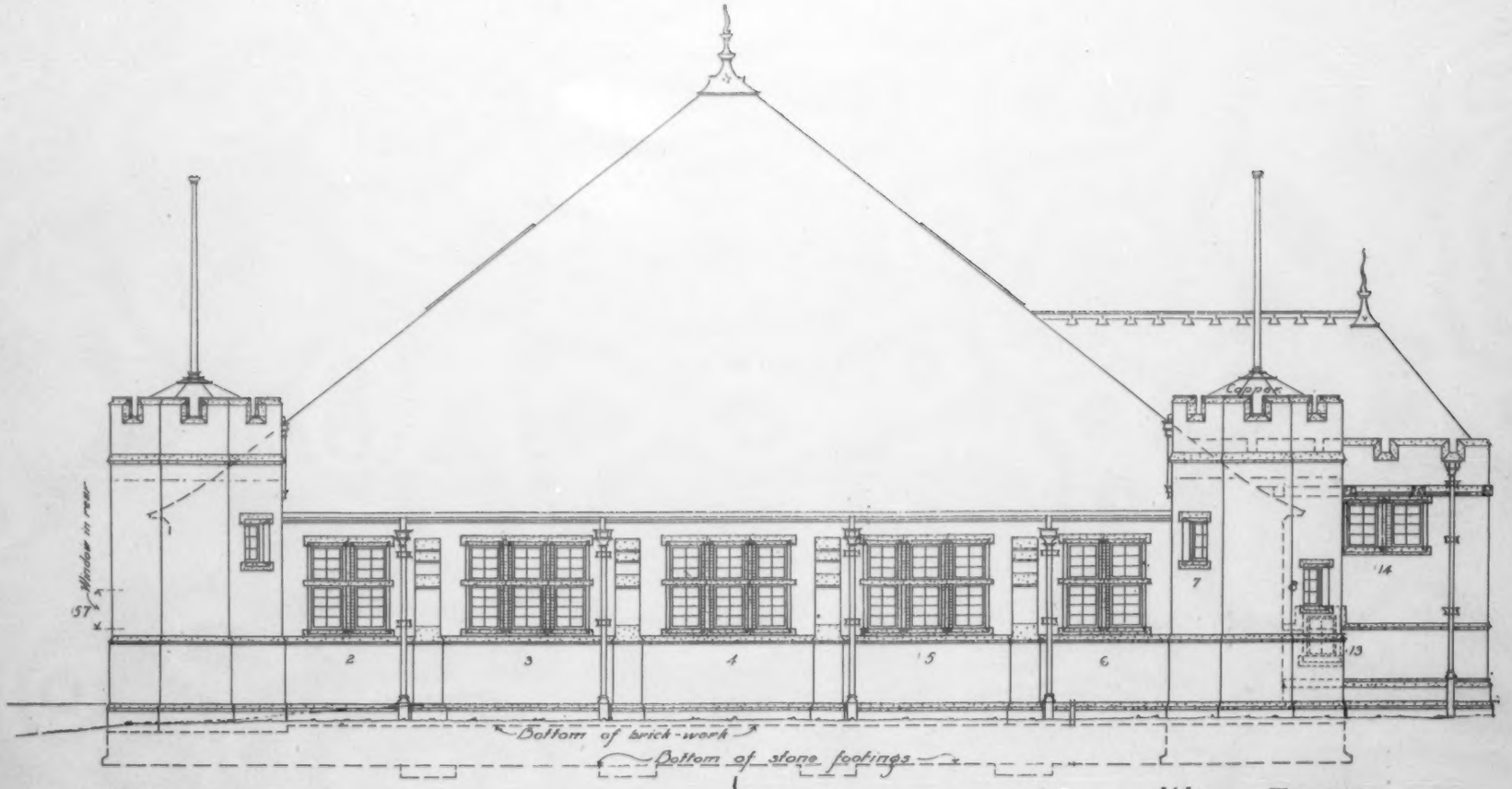
AT REAR OF BUILDING.

—SIDE ELEVATION—

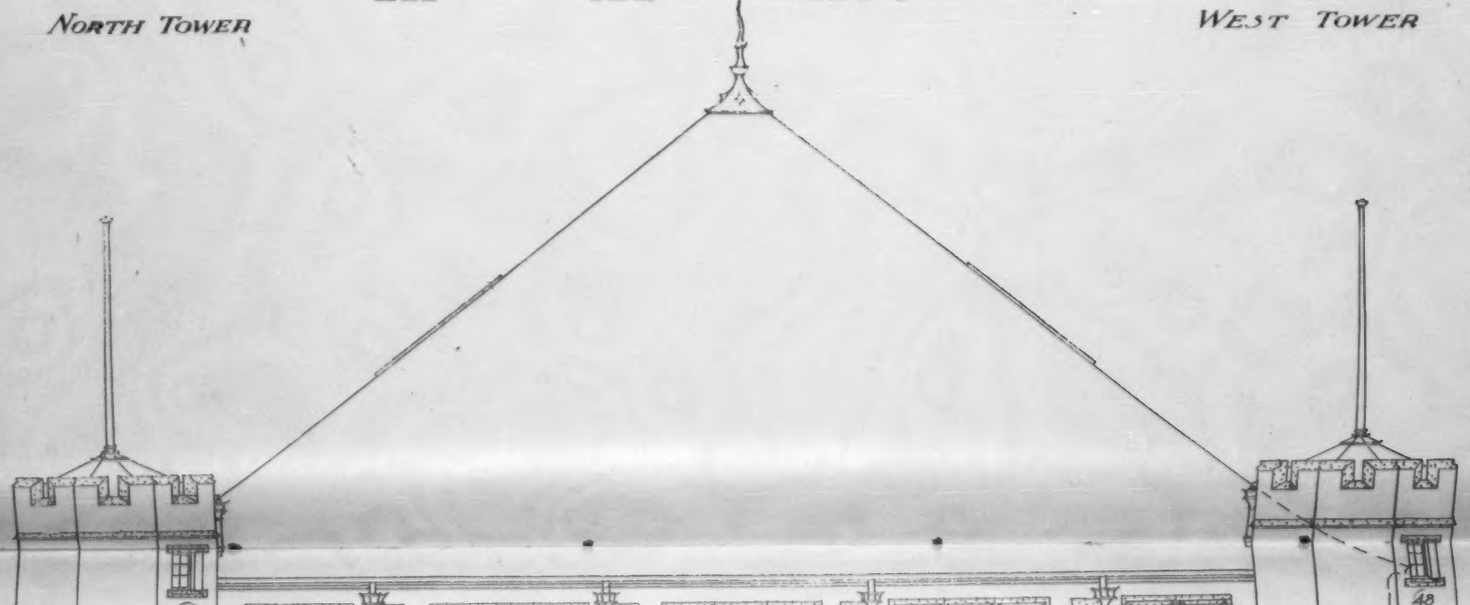
E TOWN HALL, EAST ORANGE, N. J.

NG & TILTON, ARCHITECTS.

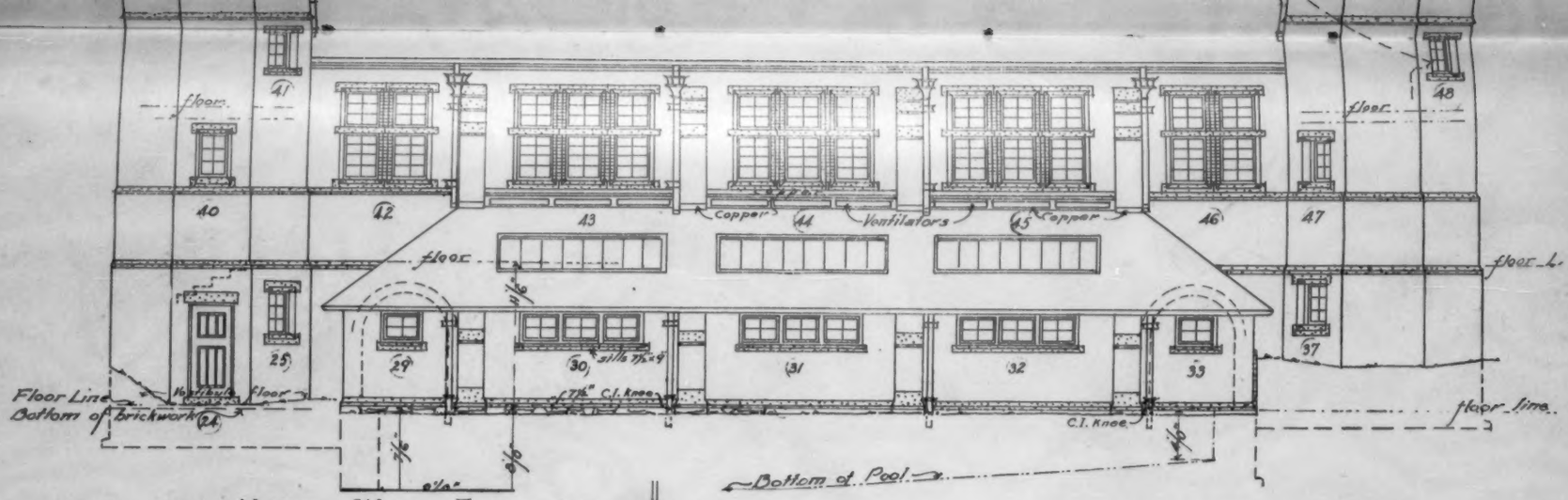


NORTH TOWER

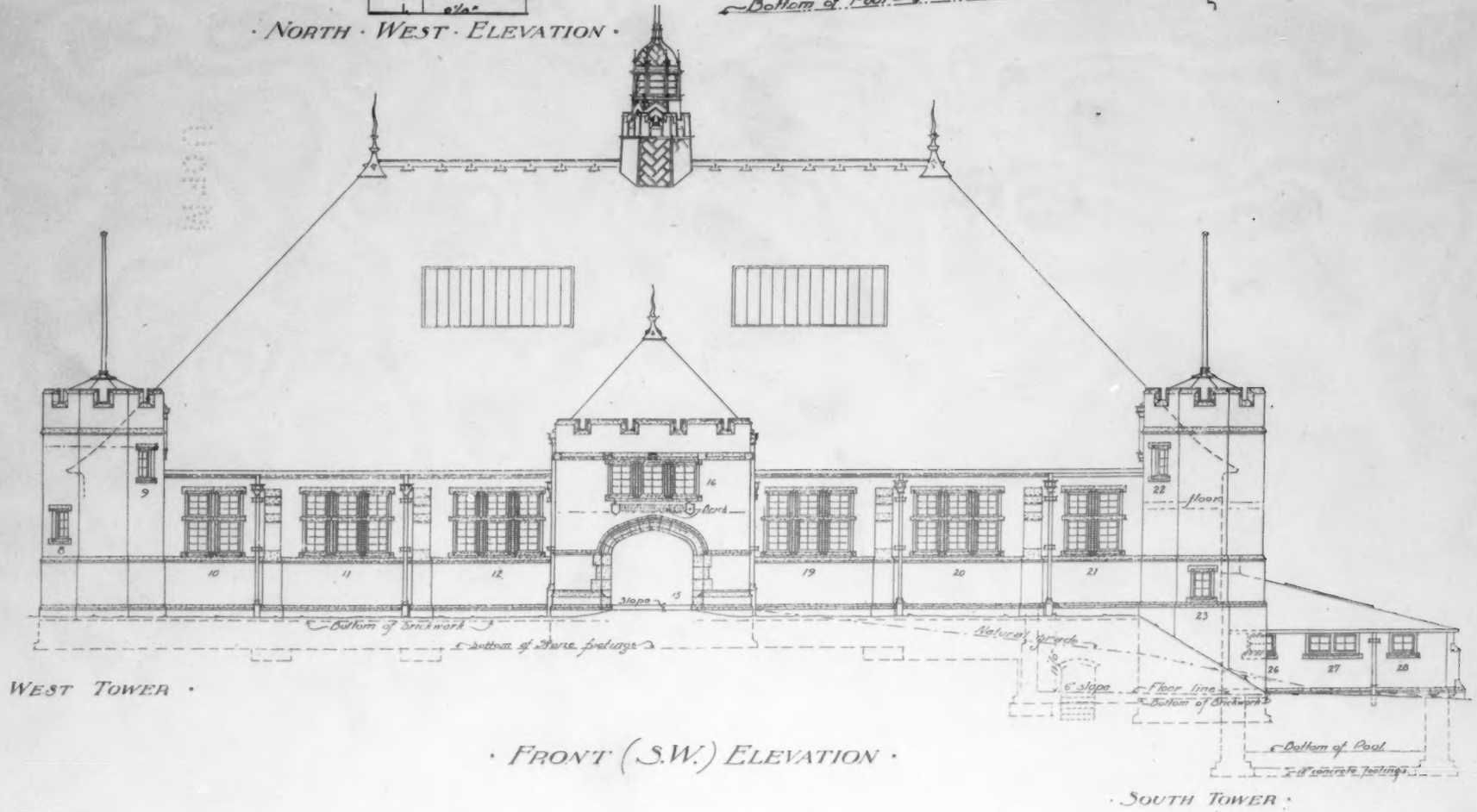
WEST TOWER



THE BRICKBUILDER
VOL. 7, NO. 7.



· NORTH · WEST · ELEVATION ·



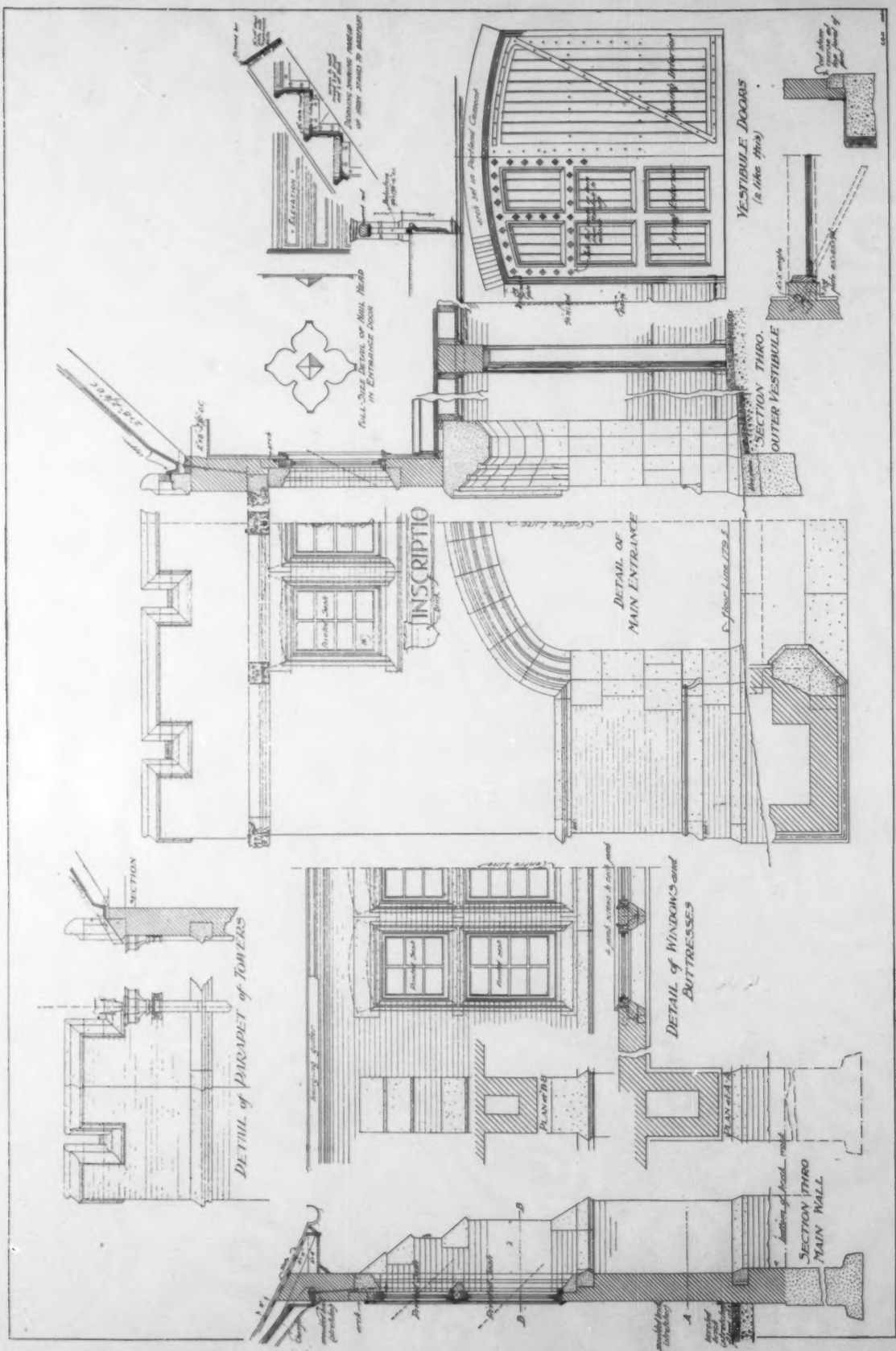
WEST TOWER ·

· FRONT (S.W.) ELEVATION ·

· SOUTH TOWER ·

GYMNASIUM AT THE HOUSE OF REFUGE, GLEN MILLS, PA.

COPE & STEWARDSON, ARCHITECTS.



DETAILS, GYMNASIUM AT THE HOUSE OF REFUGE, GLEN MILLS, PA.

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